

# BLUE - Worksheet 1

Simplify these expressions:

1.  $x \times x =$  \_\_\_\_\_
2.  $3 \times 2x =$  \_\_\_\_\_
3.  $3x \times 4x =$  \_\_\_\_\_
4.  $3x \times 4y =$  \_\_\_\_\_
5.  $3x \times 4y \times 2t =$  \_\_\_\_\_
6.  $x \times y =$  \_\_\_\_\_
7.  $y \times x =$  \_\_\_\_\_
8.  $x \times y \times r =$  \_\_\_\_\_
9.  $3x \times 5y =$  \_\_\_\_\_
10.  $3x \times 4y \times 10z =$  \_\_\_\_\_

**LOOK!**



Three boys ran in a race.  
Their total time was 24 minutes.  
Bill ran 3 minutes quicker than Peter.  
Michael ran 3 times quicker than Bill.  
Find the race times of each boy.

---

---

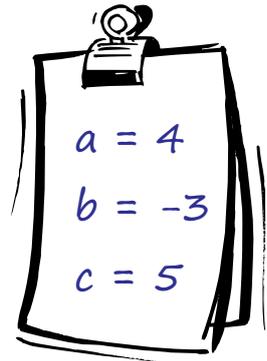
---

Simplify these expressions:

1.  $a + a$   
= \_\_\_\_\_
2.  $a + a + a$   
= \_\_\_\_\_
3.  $2a + 3a$   
= \_\_\_\_\_
4.  $3a - 2a$   
= \_\_\_\_\_
5.  $4a + 3a$   
= \_\_\_\_\_
6.  $3a + 2b + 2a$   
= \_\_\_\_\_
7.  $3a + 2b + a + 4b$   
= \_\_\_\_\_
8.  $5a - 3b - a + 2b$   
= \_\_\_\_\_
9.  $4a - 3b + 2a - 4b$   
= \_\_\_\_\_
10.  $6a - 3b - 3a - 5b$   
= \_\_\_\_\_

Substitute the values into the expressions.

1.  $c + b$  \_\_\_\_\_
2.  $a + b - 2c$  \_\_\_\_\_
3.  $4b$  \_\_\_\_\_
4.  $abc$  \_\_\_\_\_
5.  $b - c$  \_\_\_\_\_
6.  $2a + 3b$  \_\_\_\_\_
7.  $a - b$  \_\_\_\_\_
8.  $5a - 2b$  \_\_\_\_\_
9.  $ab - bc$  \_\_\_\_\_
10.  $ac - b$  \_\_\_\_\_



### TEN QUICK QUESTIONS

Write the next 3 numbers in the sequences.

1. 2, 4, 6, 8, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
2. 7, 10, 13, 16 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
3. 21, 27, 33, 39 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
4. 2, 4, 8, 16 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
5. Simplify  $a + 2a + 3a$  \_\_\_\_\_
6. Simplify  $5a - 2a$  \_\_\_\_\_
7. Simplify  $2a \times a$  \_\_\_\_\_
8. Substitute  $a = 2$  into  $3a$  and evaluate.  
\_\_\_\_\_
9. Simplify  $2a + 3b + 2a$  \_\_\_\_\_
10. Work out  $2(a + 3b)$  given that  $a = 4$ ,  $b = 2$ .  
\_\_\_\_\_  
\_\_\_\_\_

# BLUE - Worksheet 2

Substitute  $x = 6$  and  $y = 3$  then evaluate each expression.

1.  $3x$  \_\_\_\_\_

6.  $3x - 2y$  \_\_\_\_\_

2.  $x + y$  \_\_\_\_\_

7.  $\frac{x - y}{2}$  \_\_\_\_\_

3.  $2x + 3y$  \_\_\_\_\_

8.  $\frac{18}{x - y}$  \_\_\_\_\_

4.  $\frac{x}{2} + y$  \_\_\_\_\_

9.  $\frac{x}{y}$  \_\_\_\_\_

5.  $2(x + y)$  \_\_\_\_\_

10.  $\frac{3x}{2y}$  \_\_\_\_\_

For the following sequences, give the next three numbers.

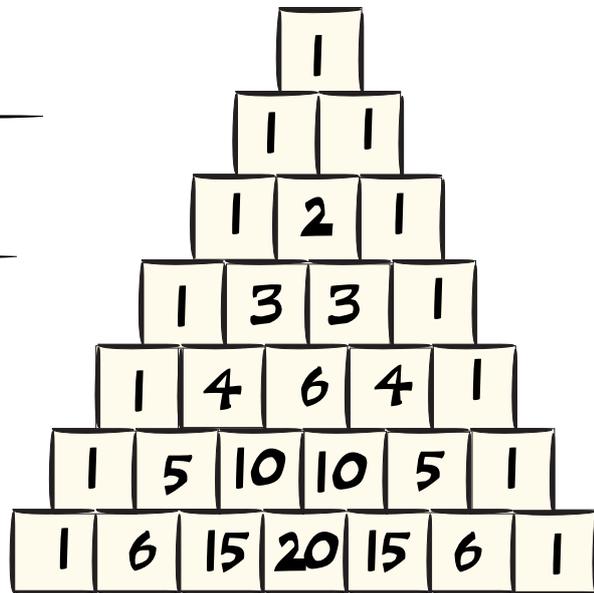
1. 2, 4, 6, 8, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

2. 18, 16, 14, 12, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

3. 1, 4, 7, 10, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

4. 7, 13, 19, 25, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

5. 1, 3, 5, 7, 9, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_



How many different number sequences can you identify in the pyramid figure above?

---



---



---

## SUDOKU

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 7 | 6 |   |   | 3 |   |   | 9 | 1 |
| 5 | 9 |   | 1 |   | 7 |   |   | 4 |
|   | 1 | 8 |   | 9 |   | 3 |   |   |
| 9 | 7 |   | 3 | 5 |   |   | 6 |   |
| 3 |   |   | 6 | 4 | 2 | 9 |   | 7 |
|   | 2 |   | 7 | 8 |   |   | 1 |   |
| 2 |   | 9 |   |   |   | 1 |   |   |
| 8 |   |   | 2 | 1 | 4 |   |   | 9 |
| 1 | 4 |   | 9 | 6 |   |   | 2 | 5 |

## PUZZLE

How many years old is a person if her age now is equal to her age in 3 years  $\times$  3, less 3 times her age 3 years ago?

---



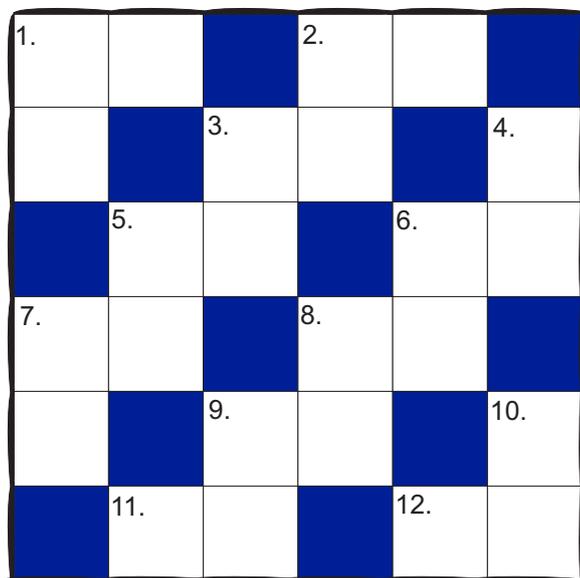
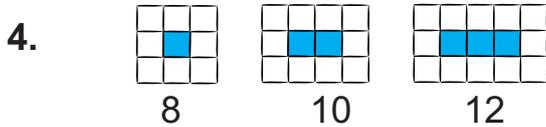
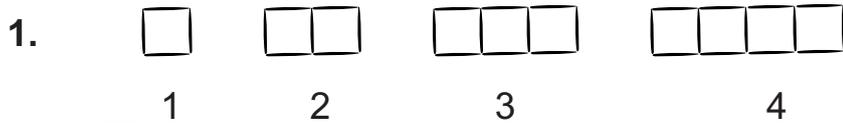
---



---

## MORE SEQUENCES

Draw the next pattern to each of the sequences.



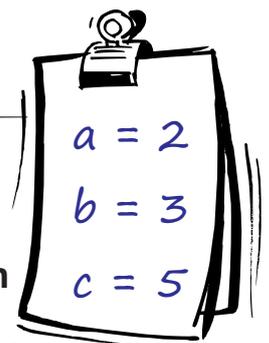
## CROSS NUMBER

### Across

1.  $6a$
2.  $5b$
3.  $3b + a$
5.  $4b + a$
6.  $6c + a$
7.  $11b + a$
8.  $3c - b$
9.  $8b - a$
11.  $2c$
12.  $4c - a$

### Down

1.  $3c$
2.  $9 + a$
3.  $7a$
4.  $3c - b$
5.  $3c$
6.  $12b - 2a$
7.  $9b + 2a$
8.  $4b$
9.  $5c - (b + a)$
10.  $6c - a$



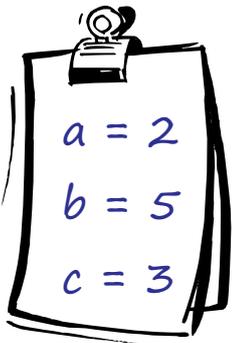
## TEN QUICK QUESTIONS

Write the next 3 numbers in the sequences.

- 1, 3, 5, 7, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- 20, 17, 14, 11, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- 3, 6, 12, 24, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- Simplify  $4b + 3b$  \_\_\_\_\_
- Simplify  $3a \times 4a$  \_\_\_\_\_
- Simplify  $\frac{a^6}{a^2}$  \_\_\_\_\_
- If  $a = 3$ , calculate  $2a - 6$  \_\_\_\_\_
- Simplify  $7a + 2b - 3a - b$   
\_\_\_\_\_
- If  $a = 4$  and  $b = 2$  calculate  $3(3b - a)$ .  
\_\_\_\_\_
- Work out  $\frac{(a + b)}{2}$  given that  $a = 4$ ,  $b = 2$ .  
\_\_\_\_\_  
\_\_\_\_\_

## ESSENTIAL SKILLS

Substitute the values into each expression.



- |    |                     |       |     |                |       |
|----|---------------------|-------|-----|----------------|-------|
| 1. | $10a - c$           | _____ | 6.  | $(2a + b)^2$   | _____ |
| 2. | $5ab - 3c$          | _____ | 7.  | $2a^2$         | _____ |
| 3. | $3(a + b)$          | _____ | 8.  | $5b - c$       | _____ |
| 4. | $\frac{3a - b}{2c}$ | _____ | 9.  | $8a^2 - 3c^2$  | _____ |
| 5. | $(b - 2)^2$         | _____ | 10. | $4(6c - 3b)^2$ | _____ |

# WHAT IS THE UNIVERSE MADE OF?

Simplify the following expressions. Use your answers to complete the question.

1.  $5x^3 \times 2x^2 \times 2$  E

2.  $(2x^2)^3$  G

3.  $\sqrt{9x^{12}}$  C

4.  $3x^2 \times 8x^5$  A

5.  $(3x)^2$  R

6.  $x^6 \div x^3$  Y

7.  $\sqrt{64x^2}$  I

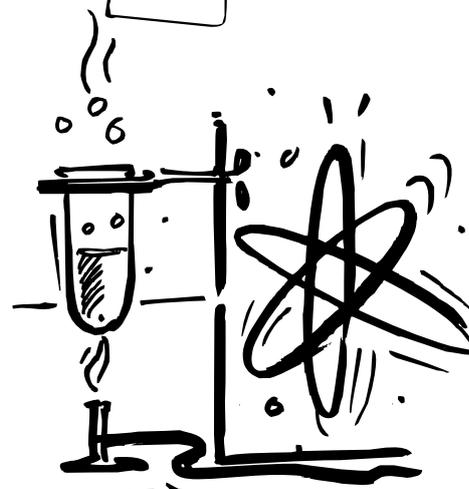
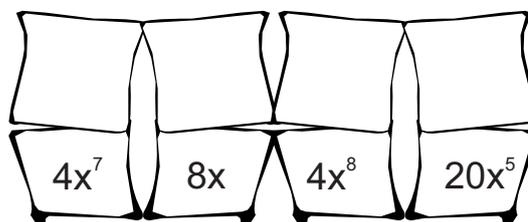
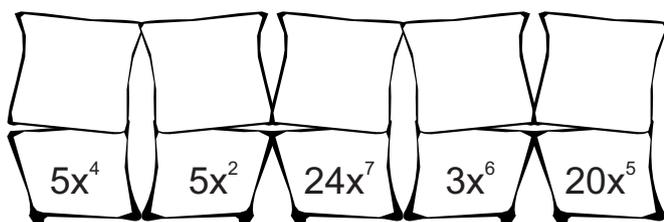
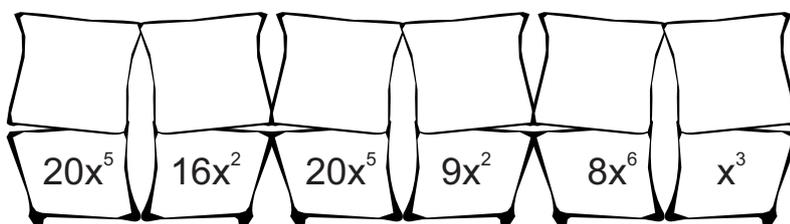
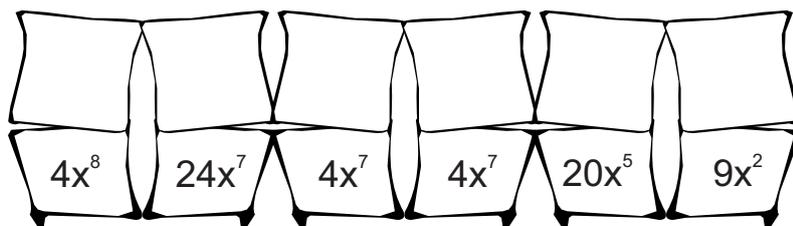
8.  $2x^2 \times 2x^4 \times x$  T

9.  $(2x + 2x)^2$  N

10.  $\frac{20x^5}{4x^3}$  P

11.  $\frac{5x^7}{x^3}$  S

12.  $\sqrt{16x^{16}}$  M



# BLUE - Worksheet 3

## ESSENTIAL SKILLS

Simplify the following:

- $2 \times 3x$  \_\_\_\_\_
- $3x \times 4y$  \_\_\_\_\_
- $2x + 5x$  \_\_\_\_\_
- $3x + 4y + 2x$  \_\_\_\_\_
- $5x + 4y - 2x - 3y$  \_\_\_\_\_
- $x^2 + x^5$  \_\_\_\_\_
- $x^3 \times x^2 \times x^4$  \_\_\_\_\_
- $3x \times 5x^2$  \_\_\_\_\_
- $\frac{x^7}{x^3}$  \_\_\_\_\_
- $\frac{8x^5}{12x^3}$  \_\_\_\_\_

## TEN QUICK QUESTIONS

Write the next 3 numbers in the sequences.

- 1, 4, 7, 10, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- 90, 85, 80, 75, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- 1, 4, 9, 16, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- 0, 3, 8, 15, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- Simplify  $2a \times 5a$  \_\_\_\_\_
- Simplify  $x^3 \times x^4$  \_\_\_\_\_
- Simplify  $3b + 2c + b + c$  \_\_\_\_\_
- If  $a = 3$ , calculate  $2a^2$  \_\_\_\_\_
- If  $a = 4$  and  $b = 1$ , calculate  $\frac{a-b}{2}$   
\_\_\_\_\_
- Find two equal numbers that sum to 28.  
\_\_\_\_\_

## PUZZLE

A farmer has 3 bales of hay:  
alfalfa, barley and wheat.

Together, the alfalfa and  
barley weigh 30kg.

Together, the barley and  
wheat weigh 50kg.

Together, the wheat and  
alfalfa weigh 40kg.

How much does each weigh?

\_\_\_\_\_

\_\_\_\_\_

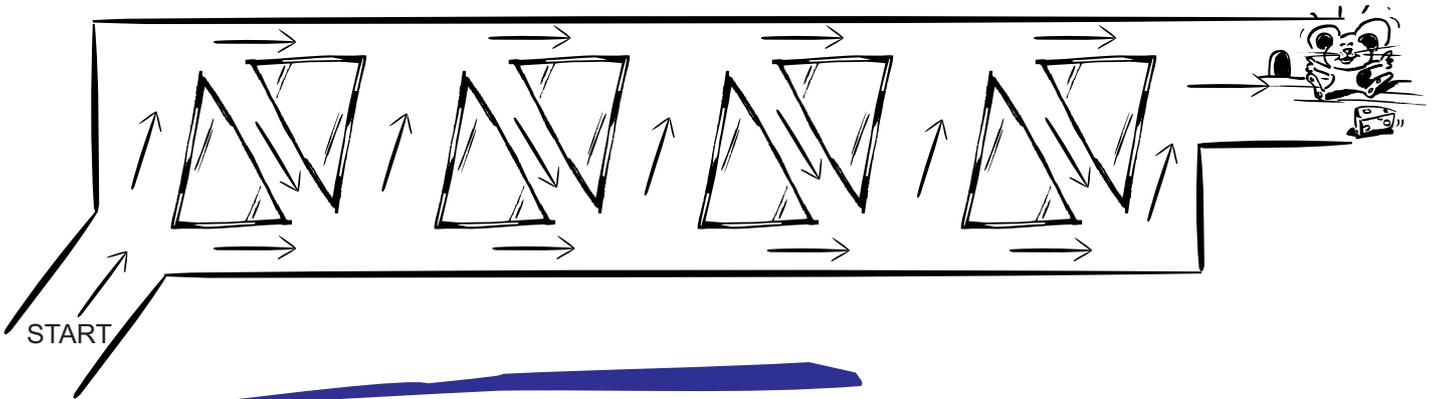
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## INVESTIGATION

A mouse can walk through the maze a number of ways. How many ways are there from start to finish?



Simplify these expressions:

1.  $x \times x =$  \_\_\_\_\_

2.  $x^2 \times x^3 =$  \_\_\_\_\_

3.  $3x^3 \times 4x^3 =$  \_\_\_\_\_

4.  $x^5 \times x^2 \times x^7 =$  \_\_\_\_\_

5.  $3(x^2 + 2x^2) =$  \_\_\_\_\_

6.  $\frac{x^5}{x^3} =$  \_\_\_\_\_

7.  $\frac{6x^5}{3x^3} =$  \_\_\_\_\_

8.  $\frac{10x^5}{8x^3} =$  \_\_\_\_\_

9.  $\frac{x^3 \times x^5}{x^3} =$  \_\_\_\_\_

10.  $\frac{x^3 + x^3}{x} =$  \_\_\_\_\_

## EQUATION SOLVING

Solve the following equations.

1.  $x + 5 = 7$  \_\_\_\_\_

2.  $x - 3 = 8$  \_\_\_\_\_

3.  $3 + x = 4$  \_\_\_\_\_

4.  $7 + x = 11$  \_\_\_\_\_

5.  $2x + 1 = 12$  \_\_\_\_\_

6.  $2x - 3 = 5$  \_\_\_\_\_

7.  $x - 11 = 0$  \_\_\_\_\_

8.  $2x + x - 3 = 6$  \_\_\_\_\_

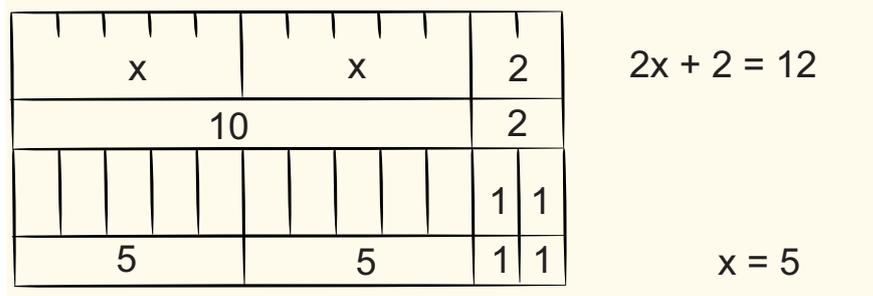
9.  $x + 11 = 11$  \_\_\_\_\_

10.  $11 - x = 5$  \_\_\_\_\_

## MORE EQUATION SOLVING

You can solve equations many different ways.

For example,  $2x + 2 = 12$  can be represented with equal sized boxes.



Solve the following equations:

1.  $2x + 3 = 15$  \_\_\_\_\_

2.  $3x + 1 = 16$  \_\_\_\_\_

3.  $2x + 7 = 9$  \_\_\_\_\_

4.  $2x - 1 = 11$  \_\_\_\_\_

5.  $2x + 7 = x + 8$  \_\_\_\_\_

6.  $3x + 3 = x + 7$  \_\_\_\_\_

7.  $2(x + 1) = 12$  \_\_\_\_\_

8.  $2(x + 3) = 16$  \_\_\_\_\_

9.  $2 + 3x = 17$  \_\_\_\_\_

10.  $5 + 2x = 7$  \_\_\_\_\_

# THE NUMBER SYSTEM

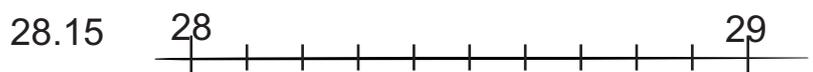
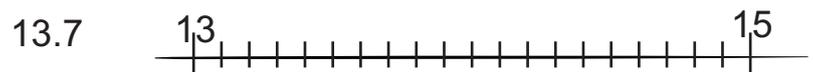
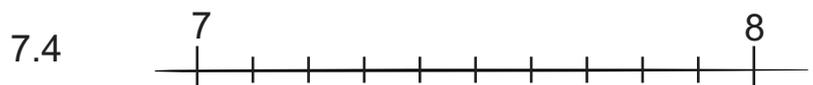
Complete the table below:

|     | <i>Number</i> | <i>Number written in words</i>                 |
|-----|---------------|--|
| 1.  | 3 906         | three thousand nine hundred and six            |
| 2.  | 190           |  |
| 3.  | 6 423         |  |
| 4.  | 67 599        |  |
| 5.  |               | one hundred and fifty nine                     |
| 6.  |               | eight thousand three hundred and fifty         |
| 7.  |               | forty four thousand two hundred and twenty one |
| 8.  |               | seven hundred and sixty four thousand          |
| 9.  | 80.5          |  |
| 10. | 5010.3        |  |
| 11. |               | twelve and fifteen hundredths                  |
| 12. |               | six thousandths                                |

## SUDOKU

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
|   |   | 9 |   |   |   | 5 |   |
| 3 |   | 7 | 4 |   |   |   |   |
|   |   |   | 7 |   | 5 | 4 | 3 |
| 9 | 1 | 5 |   | 8 |   | 2 | 7 |
|   |   | 2 |   |   |   | 3 | 9 |
|   | 3 |   |   | 9 |   | 5 | 1 |
| 6 |   | 8 | 1 |   | 7 |   |   |
|   |   |   |   |   | 2 | 1 | 6 |
|   | 7 |   |   |   |   | 2 | 5 |

Indicate these numbers on the number lines.



# BLUE - Worksheet 4



## PUZZLES

I am thinking of a number. If I treble it and subtract 3, the answer is 48. What is the number?

---

You have a 10 cm × 10 cm cube that is made from 1 cm × 1 cm cubes. If you painted the outside of the big cube blue, how many of the small 1 cm cubes would get painted?

---

## EQUATION SOLVING

Solve the following equations:

- |    |           |       |     |            |       |
|----|-----------|-------|-----|------------|-------|
| 1. | $3x = 6$  | _____ | 6.  | $5x = 95$  | _____ |
| 2. | $5x = 15$ | _____ | 7.  | $6x = 126$ | _____ |
| 3. | $4x = 8$  | _____ | 8.  | $11x = 11$ | _____ |
| 4. | $2x = 22$ | _____ | 9.  | $5x = 0$   | _____ |
| 5. | $3x = 30$ | _____ | 10. | $2x = 132$ | _____ |

|     |     |    |     |     |     |
|-----|-----|----|-----|-----|-----|
| 1.  | 2.  |    | 3.  | 4.  |     |
|     | 5.  | 6. |     | 7.  |     |
| 8.  |     | 9. | 10. |     |     |
| 11. | 12. |    |     |     | 13. |
|     | 14. |    |     | 15. |     |
| 16. |     |    | 17. |     |     |

## CROSS NUMBER

### Across

1.  $2x = 24$
3.  $2(x - 3) = 16$
5.  $2x - 1 = 81$
7.  $x \div 10 = 4$
9.  $(x - 1) \div 5 = 8$
11.  $x \div 5 = 3$
14.  $2x + 1 = 27$
15.  $x \div 2 = 20$
16.  $x \div 3 = 8$
17.  $5x - 3 = 2x + 60$

### Down

2.  $x \div 3 = 8$
4.  $2x - 3 = 25$
6.  $2(x + 6) = 40$
8.  $2x + 3 = x + 14$
10.  $x - 3 = 7$
12.  $(3x + 4) \div 2 = 773$
13.  $2x + 3 = 23$
15.  $(x - 1) \div 5 = 8$

Solve the following equations:

1.  $\frac{x}{3} = 2$  \_\_\_\_\_

2.  $\frac{x}{5} = 4$  \_\_\_\_\_

3.  $\frac{x}{6} = 6$  \_\_\_\_\_

4.  $\frac{x}{5} = 11$  \_\_\_\_\_

5.  $\frac{x}{2} = 1$  \_\_\_\_\_

6.  $\frac{x}{11} = 3$  \_\_\_\_\_

7.  $\frac{x}{5} = 0$  \_\_\_\_\_

8.  $\frac{x}{x} = 1$  \_\_\_\_\_

9.  $\frac{x}{0} = 0$  \_\_\_\_\_

10.  $\frac{x}{8} = \frac{1}{2}$  \_\_\_\_\_

### QUICK QUESTIONS

1.  $235 + 193 =$  \_\_\_\_\_

2.  $121 - 96 =$  \_\_\_\_\_

3.  $6 \times 5 - 11 \times 2 =$  \_\_\_\_\_

4.  $4 + 4 \times 4 \times 0 =$  \_\_\_\_\_

5. Find the missing numbers:  
17, 21, \_\_\_\_\_, 29, \_\_\_\_\_, 37

6. What is 10% of 450?  
\_\_\_\_\_

7. Convert 0.07 to a percentage.  
\_\_\_\_\_

8. What are the factors of 24.  
\_\_\_\_\_

9. List the prime numbers  
between 5 and 15.  
\_\_\_\_\_

10.  $\frac{3}{7} - \frac{1}{6}$  \_\_\_\_\_

### PUZZLE

The stairway shown is made of cubes. How many cubes would be needed to make the stairway if the steps at the end were 9 cubes high?



## EQUATION SOLVING

Solve the following equations

1.  $x + 3 = 11$

---

2.  $x - 3 = 7$

---

3.  $x \div 3 = 5$

---

4.  $7x = 2x - 15$

---

---

5.  $27x = 15x + 72$

---

---

6.  $2x - 1 = 7$

---

---

7.  $3x - 5 = 19$

---

---

8.  $6x - 18 = 2x + 10$

---

---

9.  $5x - 7 = -22$

---

---

10.  $7x + 3 = 3x - 13$

---

---

## QUICK CALCULATIONS

Calculate these without a calculator.

1.  $5 \times 27 \times 2$

= \_\_\_\_\_

2.  $20 \times 42 \times 5$

= \_\_\_\_\_

3.  $25 \times 9 \times 4$

= \_\_\_\_\_

4.  $50 \times 17 \times 20$

= \_\_\_\_\_

5.  $10 \times 33 \times 10$

= \_\_\_\_\_

Remember:  $99 = 100 - 1$

$9 = 10 - 1$

6.  $25 \times 99$

= \_\_\_\_\_

7.  $19 \times 9$

= \_\_\_\_\_

8.  $0.5 \times 5 \times 20$

= \_\_\_\_\_

9.  $210 \times 201$

= \_\_\_\_\_

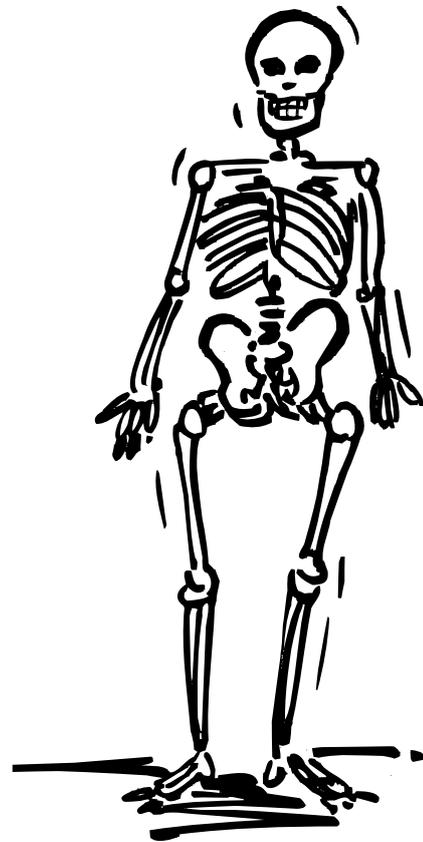
10.  $80 \times 101$

= \_\_\_\_\_

# HOW OLD ARE THE CELLS OF A BODY?

Solve the following equations. Find the answer in the column opposite and place the letter in the table below.

|          |                       |
|----------|-----------------------|
| <b>T</b> | 1. $2x = 16$          |
| <b>H</b> | 2. $x - 2 = 4$        |
| <b>E</b> | 3. $\frac{x}{5} = 3$  |
| <b>O</b> | 4. $9x + 2 = 7x - 12$ |
| <b>L</b> | 5. $7x - 1 = 6$       |
| <b>D</b> | 6. $\frac{x}{5} = -2$ |
| <b>S</b> | 7. $5x - 2 = 14 - 3x$ |
| <b>I</b> | 8. $2(x - 1) = 8$     |
| <b>V</b> | 9. $5x - 2 = 2x + 7$  |
| <b>N</b> | 10. $3x + 1 = -11$    |
| <b>Y</b> | 11. $3x - 1 = 11$     |
| <b>A</b> | 12. $4x + 3 = -7 - x$ |
| <b>R</b> | 13. $4x - 2 = x + 19$ |




---



---



---

|          |          |           |  |           |          |            |           |          |          |  |          |          |
|----------|----------|-----------|--|-----------|----------|------------|-----------|----------|----------|--|----------|----------|
|          |          |           |  |           |          |            |           |          |          |  |          |          |
| <b>8</b> | <b>6</b> | <b>15</b> |  | <b>-7</b> | <b>1</b> | <b>-10</b> | <b>15</b> | <b>2</b> | <b>8</b> |  | <b>5</b> | <b>2</b> |

|          |           |          |           |           |  |          |           |           |          |          |  |           |          |            |
|----------|-----------|----------|-----------|-----------|--|----------|-----------|-----------|----------|----------|--|-----------|----------|------------|
|          |           |          |           |           |  |          |           |           |          |          |  |           |          |            |
| <b>2</b> | <b>15</b> | <b>3</b> | <b>15</b> | <b>-4</b> |  | <b>4</b> | <b>15</b> | <b>-2</b> | <b>7</b> | <b>2</b> |  | <b>-7</b> | <b>1</b> | <b>-10</b> |

# BLUE - Worksheet 5

## EQUATION SOLVING

Solve the following equations:

1.  $2x + x = 9$

---

---

2.  $2x + 3x + 2 = 12$

---

---

3.  $3x - 6 = x$

---

---

4.  $2x - 1 = x + 3$

---

---

5.  $5x - 2 = 3x + 8$

---

---

6.  $12x = x + 11$

---

---

7.  $7x = 3x + 12$

---

---

8.  $3x = 2x - 8$

---

---

9.  $x + 5 = 2x - 3$

---

---

10.  $2x + 7 = 5x - 2$

---

---

## EXPANDING BRACKETS

Expand the following:

1.  $5(x + y)$  \_\_\_\_\_

2.  $2(x - y)$  \_\_\_\_\_

3.  $3(x + 2)$  \_\_\_\_\_

4.  $4(x - 3)$  \_\_\_\_\_

5.  $-2(x + 4)$  \_\_\_\_\_

6.  $-5(x - 6)$  \_\_\_\_\_

7.  $x(x + 5)$  \_\_\_\_\_

8.  $x(2x - 3)$  \_\_\_\_\_

9.  $3x(2x - 4)$  \_\_\_\_\_

10.  $-5x(3x + 6)$  \_\_\_\_\_

## PUZZLE

There are 4 red and 4 green counters. The object is to interchange the counters so that the green are on the left and red on the right.

Counters can only move in one direction, so red can only move right and green can only move left.

You can only move one space or jump one disc of the other colour.

What is the minimum number of moves needed to make the complete interchange?



### TEN QUICK QUESTIONS

Write the next 3 numbers in the sequences:

1. 5, 10, 15, 20, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
2. 21, 17, 13, 9, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
3. 1.3, 1.6, 1.9, 2.2, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
4. 2, 6, 18, 54, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
5. Simplify  $3a \times 2a \times 2a =$  \_\_\_\_\_
6. Simplify  $x^3 \times x^5 =$  \_\_\_\_\_
7. Simplify  $4a - 2b + 3a - b =$  \_\_\_\_\_
8. If  $a = 2$ ,  $b = 3$ , calculate  $(2a + b) \times 2$   
\_\_\_\_\_
9. If  $a = 2$ ,  $b = 3$ , calculate  $\frac{2a - b}{2}$   
\_\_\_\_\_
10. Find 3 consecutive numbers that sum to 33.  
\_\_\_\_\_

## SKILLS

Expand the following (simplify if needed).

1.  $2(a + b)$

---

2.  $3(a + b - c)$

---

3.  $-3(a - 2)$

---

4.  $-2(4a - 3)$

---

5.  $x(3x + 4)$

---

6.  $-3x(4x + 2)$

---

7.  $-2x(5x - 2)$

---

8.  $3(x + y) + 2(x + y)$

---

9.  $4(x + y) + 3(x - y)$

---

10.  $2(2x + 4) - 2(x - 3)$

---

## MORE QUICK QUESTIONS

1. Simplify  $x^3 \times x^4$

---

2. Simplify  $2x^3 \times 4x^4$

---

3. Simplify  $\frac{x^6}{x^4}$

---

4. Simplify  $\frac{8x^6}{4x^4}$

---

5. Solve  $3x = 15$

---

6. Solve  $x + 3 = -4$

---

7. Solve  $\frac{x}{5} = 6$

---

8. Solve  $x - 4 = 20$

---

9. Solve  $2x - 1 = 5$

---

10. Solve  $3x + 7 = 2x + 9$

---

## TEN QUICK QUESTIONS

Use any strategy but not a calculator.

1.  $235 + 141 =$  \_\_\_\_\_

2.  $76 - 68 =$  \_\_\_\_\_

3.  $54 \times 6 =$  \_\_\_\_\_

4.  $43 \times 100 =$  \_\_\_\_\_

5.  $160 \div 5 =$  \_\_\_\_\_

6.  $\$12.08 \div 4 =$  \_\_\_\_\_

7.  $\$2.22 \div 3 =$  \_\_\_\_\_

8.  $\$1.20 + \$2.30 =$  \_\_\_\_\_

9.  $\frac{3}{11} + \frac{4}{11} =$  \_\_\_\_\_

10.  $\frac{8}{9} - \frac{2}{9} =$  \_\_\_\_\_

## ALGEBRA

Complete the chart given the different values of x and y.

| x  | y  | x + y | xy | 2x + y | 3x - 2y |
|----|----|-------|----|--------|---------|
| 4  | 3  |       |    |        |         |
| 8  | 5  |       |    |        |         |
| 4  | -2 |       |    |        |         |
| -5 | -4 |       |    |        |         |

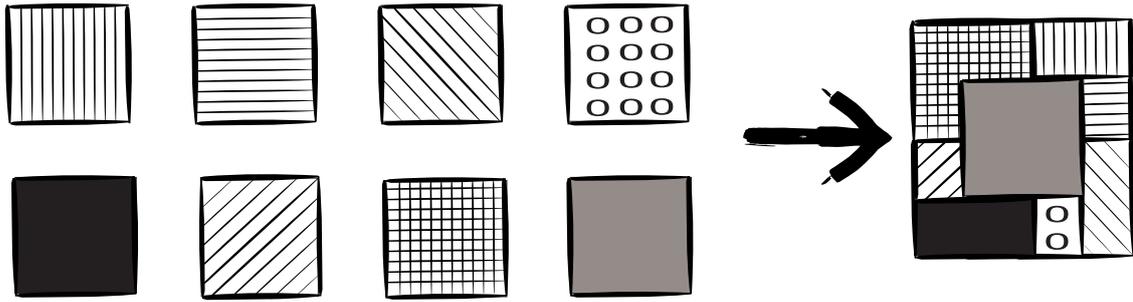
## SUDOKU

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 4 | 5 | 7 | 9 |   | 2 |   |
|   |   |   | 5 |   | 9 | 4 |
|   |   |   |   |   | 5 | 6 |
| 2 | 6 | 1 |   | 5 |   |   |
|   | 7 |   | 3 | 2 | 6 |   |
|   |   |   | 6 |   | 8 | 7 |
| 3 |   | 6 | 9 |   |   |   |
| 7 | 8 |   |   | 2 |   |   |
|   | 2 |   |   | 6 | 7 | 9 |
|   |   |   |   |   |   | 3 |

# BLUE - Worksheet 6

## PUZZLE

Eight same sized squares (pictured below) are layered on top of each other. Determine the order which they are placed with the square 8 placed last.



## EQUATION SOLVING

Solve the following equations:

1.  $2(x + 1) = 14$

---

---

2.  $2(x - 1) = 16$

---

---

3.  $3(x - 3) = 15$

---

---

4.  $4(x - 2) = -8$

---

---

5.  $2x + 1 = 4x + 3$

---

---

6.  $5(x + 2) = 2x + 1$

---

---

7.  $2(x - 3) = 3(x - 1)$

---

---

8.  $2(x - 3) = 2(x - 3)$

---

---

9.  $2(x - 3) = 2(x + 3)$

---

---

10.  $3(x + 2) + 1 = 7$

---

---

## FACTORISING

Factorise the following expressions.

- $2x + 2y$  \_\_\_\_\_
- $ax + ay$  \_\_\_\_\_
- $4x - 4y$  \_\_\_\_\_
- $5x + 5y + 5t$  \_\_\_\_\_
- $3x + 3y$  \_\_\_\_\_
- $2x + 4y$  \_\_\_\_\_
- $8x + 10y$  \_\_\_\_\_
- $6x + 15y$  \_\_\_\_\_
- $11x - 22y$  \_\_\_\_\_
- $15x - 40y$  \_\_\_\_\_

## MORE FACTORISING

Factorise the following expressions.

- $5a + 5b$  \_\_\_\_\_
- $5a + 5b + 5c$  \_\_\_\_\_
- $3x + 18$  \_\_\_\_\_
- $8x - 32$  \_\_\_\_\_
- $10x - 25$  \_\_\_\_\_
- $39x + 26$  \_\_\_\_\_
- $xy + yr$  \_\_\_\_\_
- $7x - 7y$  \_\_\_\_\_
- $ax + ay + a^2$  \_\_\_\_\_
- $8x - x^2$  \_\_\_\_\_

## QUICK QUESTIONS

- Simplify  $x^2 \times x^4 \times x^3$  \_\_\_\_\_
- Simplify  $5x^2 \times 3x^7$  \_\_\_\_\_
- Simplify  $\frac{10x^7}{4x^3}$  \_\_\_\_\_
- Solve  $4x = 24$  \_\_\_\_\_
- Solve  $x + 3 = 11$  \_\_\_\_\_
- Solve  $\frac{x}{3} = 8$  \_\_\_\_\_
- $x - 11 = 2$  \_\_\_\_\_
- Solve  $3x + 4 = 6$   
\_\_\_\_\_  
\_\_\_\_\_
- Solve  $5x - 2 = 3x + 4$   
\_\_\_\_\_  
\_\_\_\_\_
- Solve  $5x + 1 = -3$   
\_\_\_\_\_  
\_\_\_\_\_

## SUDOKU

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 |   |   |   | 2 | 1 |   | 3 |
| 2 |   |   |   |   |   | 4 | 7 |
|   | 5 |   |   | 1 | 4 | 8 | 9 |
|   |   |   |   | 4 | 9 | 2 |   |
| 8 |   | 6 |   |   |   | 3 | 9 |
|   |   | 1 | 6 | 3 |   |   |   |
|   | 9 | 2 | 8 | 6 |   | 5 |   |
| 3 | 7 |   |   |   |   |   | 1 |
| 4 |   | 5 | 2 |   |   |   | 8 |

## TEN QUICK QUESTIONS

1. Simplify  $4a \times 2a \times 3a$  \_\_\_\_\_

2. Simplify  $4x^2 \times 3x^4$  \_\_\_\_\_

3. Simplify  $3a - 2b + a + 3b$  \_\_\_\_\_

4. Solve  $2x + 1 = 7$

---

---

5. Solve  $\frac{x}{3} - 1 = 2$

---

---

6. Solve  $3x + 2 = -10$

---

---

7. Solve  $3x - 1 = x + 9$

---

---

8. Solve  $-2x + 3 = 11$

---

---

9. Expand  $3(x + 2)$

---

---

10. Expand and simplify  $4(2x + 3) + 2(x - 1)$

---

---

---

## SKILLS

Solve these equations:

1.  $2(x + 3) = 8$

---

---

6.  $2(x - 2) = 5$

---

---

2.  $5(x - 2) = 2(x + 1)$

---

---

7.  $3(x + 1) = 1$

---

---

3.  $2(x - 1) = -12$

---

---

8.  $3x + (x + 1) = 5$

---

---

4.  $3(x - 1) = x$

---

---

9.  $2x - (x - 2) = 3$

---

---

5.  $5x - 1 = 2(x + 4)$

---

---

10.  $x + 2(x - 5) = 6$

---

---

## ALGEBRA

Complete the chart given the different values of x and y.

| x  | y | $x^2 + y$ | $x^2y$ | $2x^2 + y$ | $3x - y^2$ |
|----|---|-----------|--------|------------|------------|
| 3  | 2 |           |        |            |            |
| 4  | 5 |           |        |            |            |
| -3 | 1 |           |        |            |            |
| 8  | 3 |           |        |            |            |

# BLUE - Worksheet 7

## NUMBER APPLICATIONS

1. A team in the English soccer league has 17 points. They have played 15 games. For a win there is 3 points, for a draw there is 1 point.

What are the various combinations (of Win, Draw or Lose) that would have summed to 17?

---

---

---

---

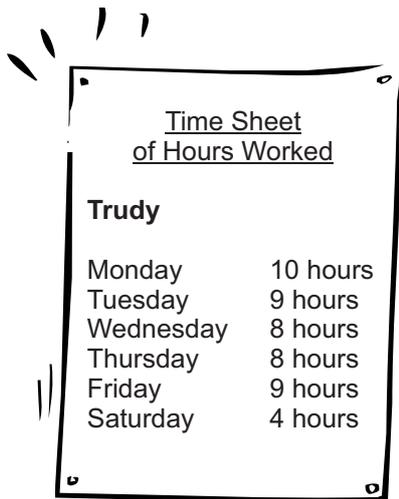
---

---

---

---

2. The weekly time sheet of hours spent at work for Trudy is below.



Time Sheet  
of Hours Worked

**Trudy**

|           |          |
|-----------|----------|
| Monday    | 10 hours |
| Tuesday   | 9 hours  |
| Wednesday | 8 hours  |
| Thursday  | 8 hours  |
| Friday    | 9 hours  |
| Saturday  | 4 hours  |

For days during the week, 8 hours is ordinary time and any hours worked after are considered overtime.

Work on Saturday is all counted as overtime.

The ordinary hourly rate is \$22.50 per hour and overtime is 1.5 times the ordinary rate.

How much would Trudy receive for the week?

---

---

---

Find the lowest common multiple of the following pairs of numbers:

1. 3 and 4 \_\_\_\_\_
2. 5 and 6 \_\_\_\_\_
3. 7 and 4 \_\_\_\_\_
4. 2 and 5 \_\_\_\_\_
5. 3 and 12 \_\_\_\_\_
6. 7 and 9 \_\_\_\_\_
7. 14 and 4 \_\_\_\_\_
8. 15 and 25 \_\_\_\_\_
9. 8 and 9 \_\_\_\_\_
10. 16 and 5 \_\_\_\_\_

Find the highest common factor of the following pairs of numbers:

1. 10 and 12 \_\_\_\_\_
2. 14 and 8 \_\_\_\_\_
3. 4 and 16 \_\_\_\_\_
4. 15 and 45 \_\_\_\_\_
5. 20 and 28 \_\_\_\_\_
6. 40 and 64 \_\_\_\_\_
7. 54 and 80 \_\_\_\_\_
8. 110 and 140 \_\_\_\_\_
9. 60 and 80 \_\_\_\_\_
10. 20, 15 and 40 \_\_\_\_\_

### INVESTIGATION

Multiplication can be down by powers.

For example:  $8 \times 4 = 2^3 \times 2^2$   
 $= 2^{3+2}$   
 $= 2^5$   
 $= 32$

$128 \div 16 = 2^7 \div 2^4$   
 $= 2^{7-4}$   
 $= 2^3$   
 $= 8$

|       |       |       |       |       |       |       |       |       |       |          |          |          |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|----------|----------|
| 1     | 2     | 4     | 8     | 16    | 32    | 64    | 128   | 256   | 512   | 1024     | 2048     | 4096     |
| $2^0$ | $2^1$ | $2^2$ | $2^3$ | $2^4$ | $2^5$ | $2^6$ | $2^7$ | $2^8$ | $2^9$ | $2^{10}$ | $2^{11}$ | $2^{12}$ |

Use the following table to do the calculations below. Only use a calculator to check your results!

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. <math>16 \times 4</math> _____</li> <li>2. <math>32 \times 64</math> _____</li> <li>3. <math>8 \times 128</math> _____</li> <li>4. <math>4 \times 128</math> _____</li> <li>5. <math>8 \times 8 \times 64</math> _____</li> </ol> | <ol style="list-style-type: none"> <li>6. <math>16 \div 4</math> _____</li> <li>7. <math>256 \div 8</math> _____</li> <li>8. <math>128 \div 16</math> _____</li> <li>9. <math>2048 \div 32</math> _____</li> <li>10. <math>4096 \div 256</math> _____</li> </ol> |
|---|--|



## NUMERACY STRATEGIES

Numbers can be added quickly by regrouping:

e.g.  $17 + 8 + 3 + 2 + 9$

$$17 + 3 + 8 + 2 + 9 = 20 + 10 + 9 = 39$$

Regroup the following numbers then find the sum.

1.  $5 + 9 + 3 + 11 + 7 =$  \_\_\_\_\_

2.  $8 + 3 + 2 + 5 + 7 =$  \_\_\_\_\_

3.  $6 + 11 + 4 + 3 + 9 =$  \_\_\_\_\_

4.  $21 + 13 + 9 + 17 =$  \_\_\_\_\_

5.  $121 + 17 + 19 + 23 =$  \_\_\_\_\_

6.  $14 + 23 + 6 + 7 + 3 =$  \_\_\_\_\_

7.  $25 + 49 + 5 + 11 + 6 =$  \_\_\_\_\_

8.  $123 + 18 + 7 + 12 =$  \_\_\_\_\_

9.  $83 + 74 + 7 + 6 + 3 =$  \_\_\_\_\_

10.  $127 + 83 + 13 + 17 + 4 =$  \_\_\_\_\_

### QUICK QUESTIONS

Use any strategy except for a calculator

1.  $37 + 142 =$  \_\_\_\_\_

2.  $58 - 47 =$  \_\_\_\_\_

3.  $31 \times 3 =$  \_\_\_\_\_

4.  $8 \times 7 =$  \_\_\_\_\_

5.  $\$1.20 \times 4 =$  \_\_\_\_\_

6.  $84c \div 4 =$  \_\_\_\_\_

7.  $50c + 125c =$  \_\_\_\_\_

8.  $\frac{1}{2}$  cake +  $\frac{1}{4}$  cake = \_\_\_\_\_

9.  $54 \div 6 =$  \_\_\_\_\_

10.  $\frac{1}{2}$  of  $\frac{1}{2} =$  \_\_\_\_\_

# BLUE - Worksheet 8

## ARE GENIUSES ECCENTRIC?

Find the value of the following expressions after substituting  $x = 2$ .  
For each answer, go to the table to work out the letter to go in the table below.

|     |                             |  |   |
|-----|-----------------------------|--|---|
| 1.  | $x^2 - 1$                   |  | Y |
| 2.  | $2x^2 + 1$                  |  | S |
| 3.  | $5x - x^2$                  |  | H |
| 4.  | $3x^2 + 1$                  |  | I |
| 5.  | $5x^2 - 4x$                 |  | U |
| 6.  | $3x^2 \div 6x$              |  | D |
| 7.  | $(5x + 3x) \div 4x$         |  | B |
| 8.  | $\frac{5x - 6}{4} \times 5$ |  | X |
| 9.  | $2x + 3$                    |  | E |
| 10. | $2(x^2 - 2)$                |  | T |
| 11. | $\frac{6x^2}{x + 1}$        |  | N |
| 12. | $3x^2 - 1$                  |  | K |
| 13. | $(x + 1)^2 + 5$             |  | O |

|   |   |   |  |   |   |   |   |  |   |   |    |   |    |
|---|---|---|--|---|---|---|---|--|---|---|----|---|----|
|   |   |   |  |   |   |   |   |  |   |   |    |   |    |
| 3 | 7 | 9 |  | 4 | 6 | 7 | 3 |  | 4 | 6 | 13 | 8 | 11 |

|    |    |   |   |    |   |   |  |   |   |   |  |   |    |   |
|----|----|---|---|----|---|---|--|---|---|---|--|---|----|---|
|    |    |   |   |    |   |   |  |   |   |   |  |   |    |   |
| 14 | 12 | 4 | 9 | 13 | 1 | 7 |  | 4 | 6 | 7 |  | 2 | 14 | 5 |

## ORDER OF OPERATIONS

The following sums have either operations (+, -, × or ÷) or brackets missing. Rewrite each sum to make the given answer.

1.  $2 + 2 \underline{\hspace{1cm}} 2 \times 2 = 0$
2.  $3 \times 3 + 3 \div 2 = 6$
3.  $4 + (4 \times 4) \underline{\hspace{1cm}} 0 = 4$
4.  $3 \underline{\hspace{1cm}} 3 \underline{\hspace{1cm}} 3 \underline{\hspace{1cm}} 3 = 7$
5.  $4 \underline{\hspace{1cm}} 2 \underline{\hspace{1cm}} 2 \underline{\hspace{1cm}} 1 = 4$
6.  $3 \underline{\hspace{1cm}} 3 \underline{\hspace{1cm}} 3 \underline{\hspace{1cm}} 1 = 3$
7.  $2 \underline{\hspace{1cm}} 2 \underline{\hspace{1cm}} 2 \underline{\hspace{1cm}} 2 = 1$
8.  $4 \underline{\hspace{1cm}} 4 \underline{\hspace{1cm}} 4 \underline{\hspace{1cm}} 2 = 16$
9.  $4 \underline{\hspace{1cm}} 4 \underline{\hspace{1cm}} 4 \underline{\hspace{1cm}} 4 = 0$
10.  $8 \underline{\hspace{1cm}} 8 \underline{\hspace{1cm}} 8 \underline{\hspace{1cm}} 8 = 4$

## ANOTHER APPLICATION

John needs to purchase 8 kg of fertiliser. The bags come in 3 sizes:

2 kg - \$1.30

3 kg - \$1.75

5 kg - \$3.00

1. What different combinations would sum to 8 kg?  

---
2. What is the cheapest cost per kilogram?  

---
3. What combinations would give the cheapest cost for 8 kg?  

---

## APPLICATION

At the end of each year students are taken to the hot pools. Costs are:

Adults: \$8  
Students: \$5  
Bus hire: \$650

There are 5 adults, 90 students and it takes 2 buses to transport them.

Students are charged \$20 each, but will it cover the total cost? Work out your answer on the clip board below.



Subtract the following. Do you really need a calculator?

1.  $8 - 2.5 =$  \_\_\_\_\_
2.  $6 - 1.28 =$  \_\_\_\_\_
3.  $7 - 2.03 =$  \_\_\_\_\_
4.  $8 - 0.03 =$  \_\_\_\_\_
5.  $14 - 1.13 =$  \_\_\_\_\_
6.  $15.45 - 15.13 =$  \_\_\_\_\_
7.  $15.45 - 0.33 =$  \_\_\_\_\_
8.  $15.45 - 6.67 =$  \_\_\_\_\_
9.  $21.03 - 11.02 =$  \_\_\_\_\_
10.  $21.03 - 12.44 =$  \_\_\_\_\_

Multiply the following. Do you really need a calculator?

1.  $3 \times 1.2 =$  \_\_\_\_\_
2.  $4 \times 0.05 =$  \_\_\_\_\_
3.  $12 \times 1.2 =$  \_\_\_\_\_
4.  $0.5 \times 1.4 =$  \_\_\_\_\_
5.  $2.6 \times 0.3 =$  \_\_\_\_\_
6.  $0.6 \times 0.3 =$  \_\_\_\_\_
7.  $0.006 \times 0.03 =$  \_\_\_\_\_
8.  $1.6 \times 0.3 =$  \_\_\_\_\_
9.  $0.006 \times 3.0 =$  \_\_\_\_\_
10.  $5.3 \times 0.005 =$  \_\_\_\_\_

### MULTIPLYING AND DIVIDING

Answer the following. NO calculators!

1.  $3.15 \times 10 =$  \_\_\_\_\_
2.  $0.015 \times 100 =$  \_\_\_\_\_
3.  $31.002 \times 100 =$  \_\_\_\_\_
4.  $0.14 \times 10 =$  \_\_\_\_\_
5.  $0.00035 \times 100 =$  \_\_\_\_\_
6.  $3.15 \div 10 =$  \_\_\_\_\_
7.  $0.015 \div 100 =$  \_\_\_\_\_
8.  $31.002 \div 100 =$  \_\_\_\_\_
9.  $0.14 \div 10 =$  \_\_\_\_\_
10.  $0.00035 \div 100 =$  \_\_\_\_\_

### NUMERACY STRATEGIES

Write these as multiplications.

1.  $32 \div 4 =$  \_\_\_\_\_
2.  $56 \div 7 =$  \_\_\_\_\_
3.  $120 \div 5 =$  \_\_\_\_\_
4.  $84 \div 4 =$  \_\_\_\_\_
5.  $63 \div 9 =$  \_\_\_\_\_
6.  $84 \div 3 =$  \_\_\_\_\_
7.  $112 \div 4 =$  \_\_\_\_\_
8.  $92 \div 4 =$  \_\_\_\_\_
9.  $225 \div 5 =$  \_\_\_\_\_
10.  $171 \div 3 =$  \_\_\_\_\_

## INVESTIGATION

1. An original price of \$100 is increased by 50%. This new price is then reduced by one third. Is the final price bigger, smaller or the same as the original?
- 

You can quickly square a number less than 100 which ends in 5 by the following method:

e.g.  $65^2$

$6 \times (6 + 1) = 42$  multiply the 10s digit by 1 plus the digit value.

$65^2 = 4225$  place the digits 2 and 5 at the end.

Use this method for the following squares:

2.  $25^2$

---

3.  $35^2$

---

4.  $75^2$

---

5.  $55^2$

---

## QUICK QUESTIONS

Use any strategy but no calculators!

1.  $47 + 94 =$

6.  $\$3.65 \times 2 =$

2.  $33 - 17 =$

7.  $\$1.20 \div 4 =$

3.  $27 \times 5 =$

8.  $73c + 17c =$

4.  $91 \times 10 =$

9.  $\frac{1}{4} + \frac{5}{4} =$

5.  $63 \div 9 =$

10.  $\frac{1}{2}$  of  $\frac{1}{4} =$

# BLUE - Worksheet 9

## NUMBER APPLICATIONS

1. Jill brought gifts for a party. She went to 5 shops and spent the following.

\$ 18.50 in Smiggles  
\$ 7.35 in Countdown  
\$ 11.93 in Whitcoulls  
\$ 33.85 in Just Jeans  
\$ 41.07 in You Beauty

If she started off with \$150, how much would she have left?

---

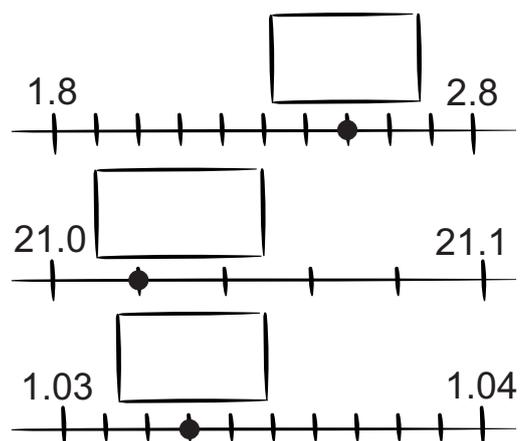
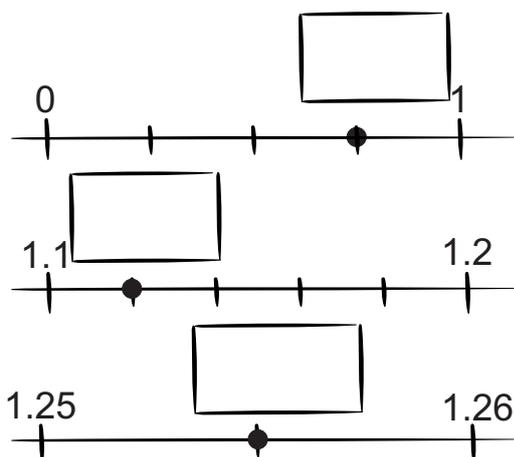
---

2. A father tells his daughter that she can either have her inheritance of \$100,000 or she can have 1c and then each day he will give her double the previous days money all through February for a total of 28 days. Which should she choose and why?

---

---

3. Look at each number line and write down the value that each point represents.



## ESTIMATION

Some calculators do not have a square root key however you can still calculate the square root of a number by using the multiplication key and estimation.

e.g.  $\sqrt{17}$  this is very close to  $\sqrt{16}$

$$4.1^2 = 16.81$$

$$4.11^2 = 16.89$$

$$4.12^2 = 16.97$$

$$4.121^2 = 16.9882$$

$$4.122^2 = 16.991$$

$$4.123^2 = 16.9991 \text{ this is a good approximation of } \sqrt{17} \text{ to 3 DP}$$

Without using the square root key on a calculator try and find the following square roots to 3 decimal places.

1. 11

2. 37

3. 6

4. 37

---



---



---



---



---



---

## PUZZLE

Place the digits 1, 2, 3, 4, 6 and 9 into the squares so that the multiplication problem is correct.

$$\begin{array}{r}
 \square \square \\
 \times \square \\
 \hline
 \square \square \square
 \end{array}$$

## SUDOKU

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   |   | 7 |   |   |   |   |   | 3 |
|   | 6 | 2 |   | 1 |   |   |   | 8 |
| 4 |   | 5 |   |   | 7 |   |   |   |
|   | 2 |   | 9 | 7 |   |   |   |   |
|   | 5 | 9 |   |   |   | 2 | 7 |   |
|   |   |   |   | 6 | 4 |   | 3 |   |
|   |   |   | 3 |   |   | 1 |   | 7 |
| 8 |   |   |   | 2 |   | 3 | 5 |   |
| 2 |   |   |   |   |   | 4 |   |   |

## NUMERACY STRATEGIES - ADDITION

Addition can be easier if you break down the numbers into powers of 10.

e.g.  $27 + 42 = 20 + 7 + 40 + 2 = 60 + 9$       Sum = 69

1.  $43 + 56$

---

2.  $17 + 82$

---

3.  $34 + 55$

---

4.  $132 + 65$

---

5.  $153 + 35$

---

6.  $112 + 42$

---

7.  $215 + 23$

---

8.  $1410 + 305$

---

9.  $2715 + 1272$

---

10.  $1731 + 2256$

---

### DECIMAL SUMS

Calculate the decimal sums.

1.  $3.7 + 2.2 =$  \_\_\_\_\_

2.  $4.5 + 6.3 =$  \_\_\_\_\_

3.  $5.5 + 6.3 =$  \_\_\_\_\_

4.  $15.7 + 13.2 =$  \_\_\_\_\_

5.  $12.03 + 0.66 =$  \_\_\_\_\_

6.  $3.7 + 4.5 =$  \_\_\_\_\_

7.  $4.7 + 8.6 =$  \_\_\_\_\_

8.  $7.7 + 8.8 =$  \_\_\_\_\_

9.  $12.45 + 1.66 =$  \_\_\_\_\_

10.  $14.06 + 1.97 =$  \_\_\_\_\_

### INVESTIGATION

Complete these calculations.

1.  $35 \square 64 = 99$

2.  $60 \square 15 = 4$

3.  $75 \square 60 = 15$

4.  $999 \square 337 = 666$

5.  $22 \square 41 = 63$

6.  $19 \square 3 = 57$

7.  $121 \square 11 = 11$

8.  $7 \square 63 = 441$

9.  $225 \square 25 = 9$

10.  $141 \square 3 = 138$

## NUMERACY STRATEGIES - DIVISION

Division can be easier if you find the same fractions of the original numbers.

$$\begin{aligned} \text{e.g. } 64 \div 16 &= 32 \div 8 \\ &= 16 \div 4 \\ &= 8 \div 2 \\ &= 4 \end{aligned}$$

Try these divisions by using the above method.

---

1.  $92 \div 4$

---

6.  $384 \div 16$

---

2.  $112 \div 8$

---

7.  $192 \div 8$

---

3.  $128 \div 4$

---

8.  $84 \div 6$

---

4.  $180 \div 4$

---

9.  $288 \div 8$

---

5.  $336 \div 8$

---

10.  $150 \div 6$

---

### QUICK QUESTIONS

Use any strategy except for a calculator.

1.  $153 + 47 =$  \_\_\_\_\_

6.  $\$13.15 \times 3 =$  \_\_\_\_\_

2.  $111 - 97 =$  \_\_\_\_\_

7.  $\$1.52 \div 4 =$  \_\_\_\_\_

3.  $43 \times 7 =$  \_\_\_\_\_

8.  $\frac{1}{7} + \frac{2}{7} =$  \_\_\_\_\_

4.  $125 \times 10 =$  \_\_\_\_\_

9.  $83c + 17c =$  \_\_\_\_\_

5.  $141 \div 3 =$  \_\_\_\_\_

10.  $\frac{1}{2}$  of  $\frac{1}{8} =$  \_\_\_\_\_

# BLUE - Worksheet 10

## NUMERACY STRATEGIES - SUBTRACTION

Subtraction can be easier if you break down the numbers into powers of 10.

e.g.  $57 - 35 = (50 + 7) - (30 + 5) = (50 - 30) + (7 - 5) = 22$

1.  $67 - 42$

---

2.  $95 - 71$

---

3.  $48 - 17$

---

4.  $97 - 65$

---

5.  $345 - 123$

---

6.  $83 - 41$

---

7.  $129 - 17$

---

8.  $348 - 236$

---

9.  $415 - 205$

---

10.  $1381 - 130$

---

## NUMBER APPLICATIONS

1. Three men sprinted 100 metres, each with the following times:  
placing

Peter 9.91 seconds \_\_\_\_\_

Michael 9.97 seconds \_\_\_\_\_

Philip 9.899 seconds \_\_\_\_\_

the  
**Winner**

Who was first, second and third? \_\_\_\_\_

Add and subtract the following fractions

1.  $\frac{2}{7} + \frac{2}{7} =$  \_\_\_\_\_

2.  $\frac{3}{9} + \frac{2}{9} =$  \_\_\_\_\_

3.  $\frac{25}{63} + \frac{14}{63} =$  \_\_\_\_\_

4.  $\frac{11}{20} + \frac{3}{20} + \frac{4}{20} =$  \_\_\_\_\_

5.  $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} =$  \_\_\_\_\_

6.  $\frac{4}{9} - \frac{2}{9} =$  \_\_\_\_\_

7.  $\frac{11}{12} - \frac{3}{12} =$  \_\_\_\_\_

8.  $\frac{21}{30} - \frac{11}{30} =$  \_\_\_\_\_

9.  $\frac{5}{50} - \frac{4}{50} =$  \_\_\_\_\_

10.  $\frac{21}{67} - \frac{17}{67} =$  \_\_\_\_\_

1.  $\frac{1}{2} + \frac{1}{3} =$  \_\_\_\_\_

2.  $\frac{1}{4} + \frac{1}{7} =$  \_\_\_\_\_

3.  $\frac{3}{4} + \frac{2}{7} =$  \_\_\_\_\_

4.  $\frac{1}{6} + \frac{1}{6} + \frac{1}{6} =$  \_\_\_\_\_

5.  $\frac{3}{11} + \frac{2}{5} =$  \_\_\_\_\_

6.  $\frac{1}{8} - \frac{1}{7} =$  \_\_\_\_\_

7.  $\frac{2}{5} + \frac{1}{4} =$  \_\_\_\_\_

8.  $\frac{2}{5} - \frac{1}{4} =$  \_\_\_\_\_

9.  $\frac{3}{4} - \frac{2}{7} =$  \_\_\_\_\_

10.  $\frac{1}{2} + \frac{1}{4} - \frac{1}{3} =$  \_\_\_\_\_

Simplify the following fractions.

1.  $\frac{6}{10}$

2.  $\frac{3}{15}$

3.  $\frac{9}{15}$

4.  $\frac{20}{50}$

5.  $\frac{21}{28}$

6.  $\frac{14}{10}$

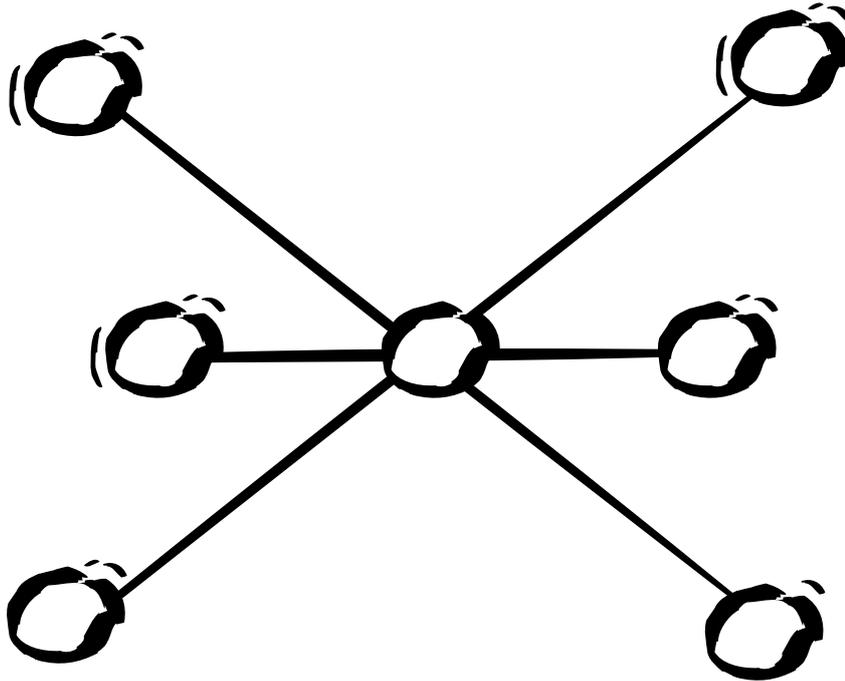
7.  $\frac{32}{20}$

8.  $\frac{28}{42}$

9.  $\frac{18}{64}$

## PUZZLE

Place the numbers 1, 2, 3, 4, 5, 6 and 7 in the circles so that the sum along each line is 14.



## APPLICATIONS

- Jane intends travelling to Britain. A bank is selling British currency at 0.4413 pounds (£) for each dollar.  
Convert NZ\$ 3 500 to British pounds.

---

- Jane decides the next day she is not going overseas and wants to convert the pounds back to New Zealand dollars. The buy rate of the bank is 0.4453 pounds (£) per NZ dollar (\$).  
How much in New Zealand dollars would this be?

---

- Why is there a difference between what she initially spent and what she received a day later?

---

## INVESTIGATION

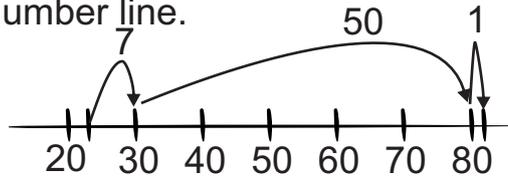
Find the odd one out in each of these sets of sums.

|    |                 |                |                  |
|----|-----------------|----------------|------------------|
| 1. | $93 + 145 + 12$ | $175 - 8 + 83$ | $153 + 124 - 23$ |
| 2. | $215 \times 12$ | $50 \times 53$ | $43 \times 60$   |
| 3. | $4032 \div 63$  | $320 \div 5$   | $804 \div 12$    |

## NUMERACY STRATEGIES - ADDITION

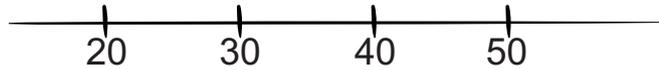
Addition can be easier if you use a number line.

e.g.  $23 + \boxed{58} = 81$

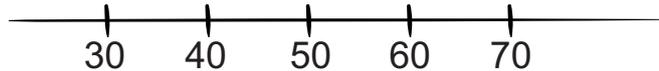


Use the number lines to complete these addition sums.

1.  $18 + \boxed{\phantom{00}} = 57$



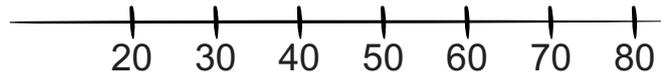
2.  $29 + \boxed{\phantom{00}} = 73$



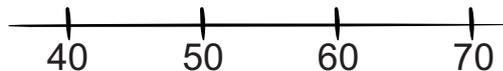
3.  $33 + \boxed{\phantom{00}} = 49$



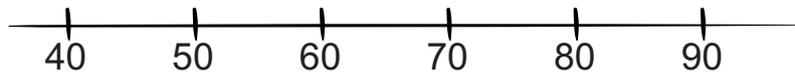
4.  $22 + \boxed{\phantom{00}} = 79$



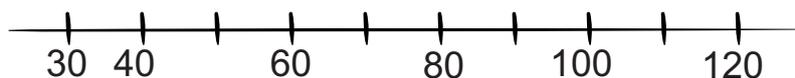
5.  $39 + \boxed{\phantom{00}} = 65$



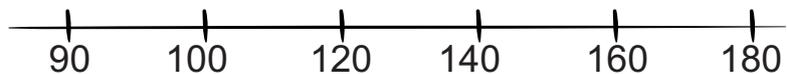
6.  $47 + \boxed{\phantom{00}} = 93$



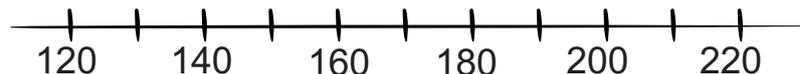
7.  $28 + \boxed{\phantom{00}} = 121$



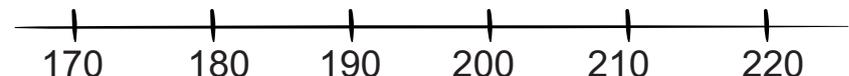
8.  $93 + \boxed{\phantom{00}} = 173$



9.  $121 + \boxed{\phantom{00}} = 217$



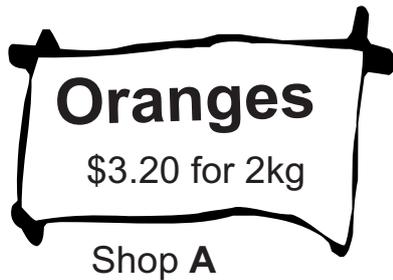
10.  $169 + \boxed{\phantom{00}} = 223$



# BLUE - Worksheet 11

## APPLICATIONS

1. Two different shops advertise oranges for sale.



Which shop is giving the best buy for 7kg of oranges?

---

---

---

2. Two building suppliers advertise topsoil for sale.

Building Supplier A offers topsoil at \$130 per 2 cubic metres.  
Building Supplier B offers topsoil at \$25 per  $\frac{1}{2}$  cubic metre.

Which supplier offers the best buy for 3 cubic metres of topsoil?

---

---

---

## INVESTIGATION

Use any of the the symbols ( , ) , + , - ,  $\times$  , or  $\div$  to make the expression below into the largest possible number. Each symbol can only be used once.

$$9 \quad 7 \quad 16 \quad 0.5 =$$

# SOLVE THE CODE

Solve the following equations. Place the letter in the table below to solve the code.

1. 

|   |
|---|
| A |
|---|

 $\frac{3}{5} + \frac{1}{6} =$
2. 

|   |
|---|
| N |
|---|

 $\frac{3}{5} - \frac{2}{6} =$
3. 

|   |
|---|
| P |
|---|

 $\frac{3}{5} - \frac{1}{4} =$
4. 

|   |
|---|
| I |
|---|

 $\frac{4}{5} - \frac{1}{6} =$
5. 

|   |
|---|
| O |
|---|

 $\frac{4}{6} + \frac{1}{6} =$
6. 

|   |
|---|
| H |
|---|

 $\frac{1}{5} + \frac{1}{3} =$
7. 

|   |
|---|
| C |
|---|

 $\frac{1}{5} + \frac{1}{4} =$
8. 

|   |
|---|
| M |
|---|

 $\frac{5}{8} + \frac{2}{3} =$
9. 

|   |
|---|
| W |
|---|

 $\frac{1}{6} + \frac{1}{3} =$
10. 

|   |
|---|
| U |
|---|

 $\frac{1}{6} + \frac{1}{5} =$
11. 

|   |
|---|
| T |
|---|

 $\frac{5}{6} - \frac{2}{3} =$
12. 

|   |
|---|
| S |
|---|

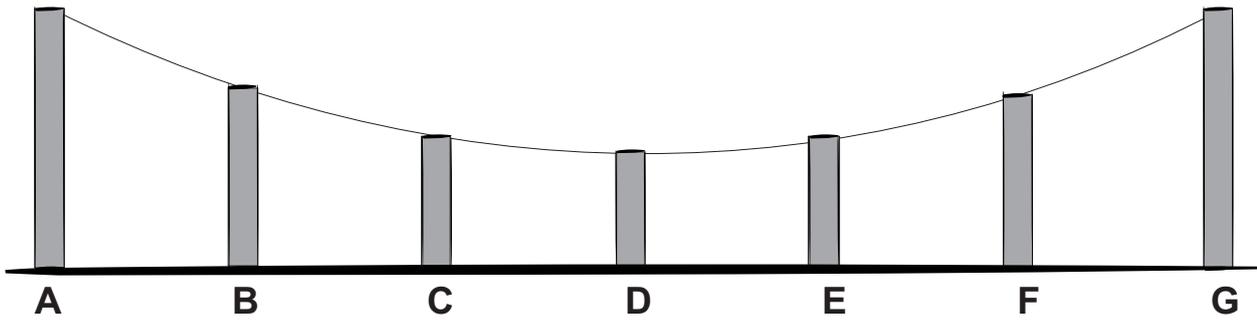
 $\frac{5}{6} - \frac{1}{4} =$

**WHAT IS A VOLCANO?**

|                 |                 |               |                 |                |               |                 |                 |                |  |
|-----------------|-----------------|---------------|-----------------|----------------|---------------|-----------------|-----------------|----------------|--|
|                 |                 |               |                 |                |               |                 |                 |                |  |
| $\frac{23}{30}$ | $\frac{31}{24}$ | $\frac{5}{6}$ | $\frac{11}{30}$ | $\frac{4}{15}$ | $\frac{1}{6}$ | $\frac{23}{30}$ | $\frac{19}{30}$ | $\frac{4}{15}$ |  |

|               |                 |               |                |                |                 |                |                |                 |                |                |
|---------------|-----------------|---------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|
|               |                 |               |                |                |                 |                |                |                 |                |                |
| $\frac{1}{2}$ | $\frac{19}{30}$ | $\frac{1}{6}$ | $\frac{8}{15}$ | $\frac{8}{15}$ | $\frac{19}{30}$ | $\frac{9}{20}$ | $\frac{9}{20}$ | $\frac{11}{30}$ | $\frac{7}{20}$ | $\frac{7}{12}$ |

## APPLICATION



The above diagram is of a section of a bridge.  
A, B, C, D, E, F, G are vertical supports.

The vertical support A = 10 metres long.  
ALSO: length A = G, length B = F and length C = E

The length of B is  $\frac{3}{5}$  of A.

The length of C is  $\frac{4}{5}$  of B

The length of D is  $\frac{9}{10}$  of C

Calculate the total length of the supports.

---

---

---

---

---

---

## FRACTIONS TO DECIMALS

Change these fractions to decimals.

- $\frac{1}{10}$  \_\_\_\_\_
- $\frac{3}{10}$  \_\_\_\_\_
- $\frac{2}{5}$  \_\_\_\_\_
- $\frac{17}{100}$  \_\_\_\_\_
- $\frac{1}{8}$  \_\_\_\_\_

- $\frac{3}{8}$  \_\_\_\_\_
- $\frac{3}{1000}$  \_\_\_\_\_
- $\frac{21}{50}$  \_\_\_\_\_
- $\frac{8}{20}$  \_\_\_\_\_
- $1\frac{3}{4}$  \_\_\_\_\_

## DECIMALS TO FRACTIONS

Change these decimals to fractions.

1. 0.4 \_\_\_\_\_

2. 0.5 \_\_\_\_\_

3. 0.2 \_\_\_\_\_

4. 0.13 \_\_\_\_\_

5. 0.27 \_\_\_\_\_

6. 0.314 \_\_\_\_\_

7. 0.175 \_\_\_\_\_

8. 0.002 \_\_\_\_\_

9. 0.006 \_\_\_\_\_

10. 0.01 \_\_\_\_\_

## QUICK QUESTIONS

Use any strategy. Don't use a calculator.

1.  $1.41 + 2.53 =$  \_\_\_\_\_

2.  $25.4 - 24.1 =$  \_\_\_\_\_

3.  $25 \times 7 =$  \_\_\_\_\_

4.  $2.5 \times 7 =$  \_\_\_\_\_

5.  $24 \div 3 =$  \_\_\_\_\_

6.  $2.4 \div 3 =$  \_\_\_\_\_

7. Round 3.156 to 1 DP.  
\_\_\_\_\_

8.  $-2 + 4 =$  \_\_\_\_\_

9.  $-2 - -3 =$  \_\_\_\_\_

10.  $3 - -4 + -5 =$  \_\_\_\_\_

11.  $2.15 + 4.62 =$  \_\_\_\_\_

12.  $7.53 - 7.39 =$  \_\_\_\_\_

13.  $24 \times 6 =$  \_\_\_\_\_

14.  $2.4 \times 6 =$  \_\_\_\_\_

15.  $141 \div 3 =$  \_\_\_\_\_

16.  $14.1 \div 3 =$  \_\_\_\_\_

17. Round 5.394 to 1 DP.  
\_\_\_\_\_

18.  $-12 + 3 =$  \_\_\_\_\_

19.  $-4 - -6 =$  \_\_\_\_\_

20.  $-8 + -2 - -6 =$  \_\_\_\_\_

# BLUE - Worksheet 12

## APPLICATIONS

1. Noel and Margaret each had a salary of \$60 000 in 2008. Noel's salary increased by 11% in 2009 and then increased 6% in 2010. Margaret's salary was increased by 6% in 2009 and then increased by 11% in 2010. Who had the greater salary in 2010? Make a guess then check your guess with a calculation.

---

---

---

2. A person decides to go on a diet. To get to a healthy weight they must reduce their food intake by 15%.

An average intake is 9200 kJ a day.

How much of a reduction in average food intake would they need, to get to a healthy weight?

---

---

3. A real estate agent is paid a commission for selling a house. The commission is based on:

Sales for:           the first \$300 000, commission is 3.95%  
                          amounts above \$300 000, commission is 2%

How much would be paid to an agent who sells a house for \$757 000?

---

---

---

## PERCENTAGES TO FRACTIONS AND FRACTIONS TO PERCENTAGES

Change to percentages:

1.  $\frac{1}{2}$  \_\_\_\_\_

2.  $\frac{3}{5}$  \_\_\_\_\_

3.  $\frac{17}{20}$  \_\_\_\_\_

4.  $\frac{41}{50}$  \_\_\_\_\_

5.  $\frac{7}{10}$  \_\_\_\_\_

6.  $\frac{1}{3}$  \_\_\_\_\_

7.  $\frac{5}{6}$  \_\_\_\_\_

8.  $\frac{2}{7}$  \_\_\_\_\_

9.  $\frac{14}{35}$  \_\_\_\_\_

10.  $\frac{26}{71}$  \_\_\_\_\_

Change to fractions:

1. 21% \_\_\_\_\_

2. 19% \_\_\_\_\_

3. 35% \_\_\_\_\_

4. 63% \_\_\_\_\_

5. 40% \_\_\_\_\_

6. 15% \_\_\_\_\_

7. 75% \_\_\_\_\_

8. 83% \_\_\_\_\_

9. 7% \_\_\_\_\_

10. 1% \_\_\_\_\_

### INVESTIGATION

How many times would you need to wind a string around your head before it was the same measurement as your height?

---

---

---

# WHAT IS THE BASIC PRINCIPLE BEHIND ASSETS?

Do the calculations and place the correct letter above the answers below.

1. **T**  $173 - 93 =$

2. **U**  $56 + 17 =$

3. **E**  $3 \times 31 + 7 \times 31 =$

4. **M**  $0.27 - 0.15 =$

5. **O**  $125 \times 3 =$

6. **R**  $1.25 \times 3 =$

7. **S**  $0.351 \times 10 =$

8. **L**  $0.0816 \times 100 =$

9. **I**  $11.5 \div 1000 =$

10. **D**  $-17 + 25 =$

11. **A**  $-3 - -6 =$

12. **N**  $2 \times -4 \times -3 =$

13. **G**  $14 + (10 - 3 \times 2) =$

14. **W**  $30\% \text{ of } 40 =$

15. **N**  $2^5 =$

16. **H**  $\sqrt{81} =$

|           |          |            |             |            |             |            |             |            |             |               |          |
|-----------|----------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|---------------|----------|
| <u>80</u> | <u>9</u> | <u>310</u> | <u>0.12</u> | <u>375</u> | <u>3.75</u> | <u>310</u> | <u>3.51</u> | <u>375</u> | <u>8.16</u> | <u>0.0115</u> | <u>8</u> |
|-----------|----------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|---------------|----------|

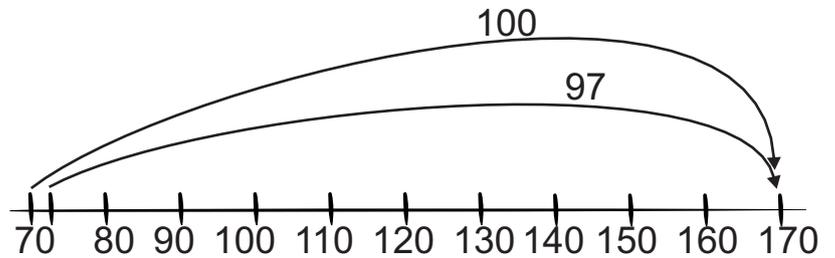
|           |          |            |          |             |             |            |           |           |          |            |
|-----------|----------|------------|----------|-------------|-------------|------------|-----------|-----------|----------|------------|
| <u>80</u> | <u>9</u> | <u>310</u> | <u>3</u> | <u>3.51</u> | <u>3.51</u> | <u>310</u> | <u>80</u> | <u>80</u> | <u>9</u> | <u>310</u> |
|-----------|----------|------------|----------|-------------|-------------|------------|-----------|-----------|----------|------------|

|             |            |           |           |            |             |               |           |
|-------------|------------|-----------|-----------|------------|-------------|---------------|-----------|
| <u>8.16</u> | <u>375</u> | <u>24</u> | <u>18</u> | <u>310</u> | <u>3.75</u> | <u>0.0115</u> | <u>80</u> |
|-------------|------------|-----------|-----------|------------|-------------|---------------|-----------|

|           |               |             |             |            |           |          |           |             |            |
|-----------|---------------|-------------|-------------|------------|-----------|----------|-----------|-------------|------------|
| <u>12</u> | <u>0.0115</u> | <u>8.16</u> | <u>8.16</u> | <u>310</u> | <u>32</u> | <u>8</u> | <u>73</u> | <u>3.75</u> | <u>310</u> |
|-----------|---------------|-------------|-------------|------------|-----------|----------|-----------|-------------|------------|

## ARITHMETIC STRATEGIES

$$\begin{array}{r} 73 + 97 \\ -3 \quad +3 \\ \hline 70 + 100 = 170 \end{array}$$



1.  $35 + 89$

2.  $47 + 96$

3.  $37 + 197$

4.  $93 + 289$

5.  $163 + 84$



6.  $47 + 87$

7.  $73 + 49$

8.  $114 + 97$

9.  $128 + 87$

10.  $311 + 93$

## QUICK QUESTIONS

Do these without a calculator.

1.  $35 + 97$

2.  $3.25 - 1.17$

3.  $-7 - -12$

4.  $2 \times -8$

5.  $-4 \times -2$

6.  $8 \div -2$

7.  $5 \times (2 + 4 \times 3)$

8.  $\frac{2}{3} + \frac{1}{5}$

9.  $\frac{1}{3} \div \frac{3}{10}$

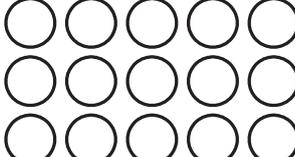
10.  $\frac{4}{5} \times \frac{1}{6}$

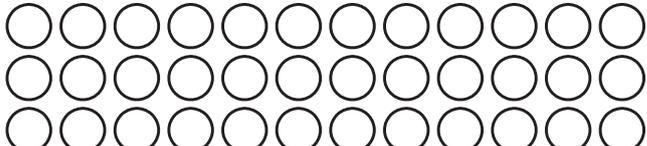
# BLUE - Worksheet 13

## RATIOS

Colour the following circles to show the ratios given.

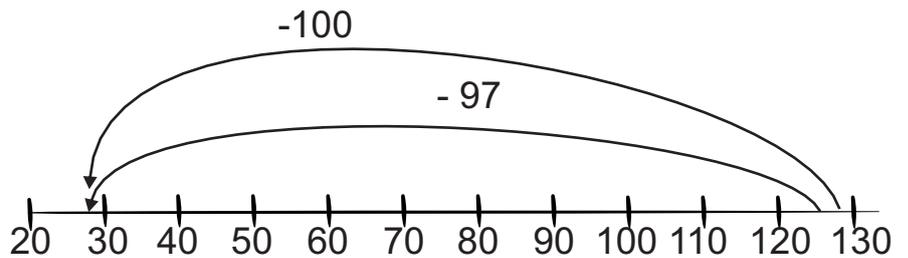
1. 2 : 1 

2. 4 : 1 

3. 5 : 7 

## ARITHMETIC STRATEGIES

$$\begin{array}{r} 125 - 97 \\ + 3 \quad + 3 \\ \hline 128 - 100 = 28 \end{array}$$



1. 834 - 99

2. 456 - 98

3. 183 - 89

4. 247 - 194

5. 314 - 184



6. 111 - 97

7. 176 - 94

8. 183 - 87

9. 218 - 92

10. 345 - 89

## FIND THE HIDDEN MESSAGE

Do the calculations. Write the corresponding letter above the answers at the bottom of the page to solve the code.

1. **D** = 12% of 78

10. **A** = 32% of 150

2. **B** = 6% of 312

11. **O** = 18% of 140

3. **N** = 25% of 78

12. **S** = 23% of 96

4. **I** = 82% of 95

13. **R** = 8% of 220

5. **Y** = 14% of 60

14. **K** = 19% of 72

6. **T** = 20% of 150

15. **L** = 25% of 120

7. **H** = 17% of 130

16. **U** = 18% of 160

8. **C** = 11% of 44

17. **W** = 50% of 162

9. **E** = 7% of 215

|  |      |      |    |       |      |     |       |
|--|------|------|----|-------|------|-----|-------|
|  |      |      |    |       |      |     |       |
|  | 4.84 | 25.2 | 81 | 18.72 | 25.2 | 8.4 | 22.08 |
|  |      |      |    |       |      |     |       |

|  |    |      |       |       |  |    |      |
|--|----|------|-------|-------|--|----|------|
|  |    |      |       |       |  |    |      |
|  | 30 | 77.9 | 13.68 | 15.05 |  | 30 | 25.2 |
|  |    |      |       |       |  |    |      |

|  |      |      |      |       |       |  |  |
|--|------|------|------|-------|-------|--|--|
|  |      |      |      |       |       |  |  |
|  | 22.1 | 25.2 | 17.6 | 22.08 | 15.05 |  |  |
|  |      |      |      |       |       |  |  |

|  |    |      |      |      |      |      |  |
|--|----|------|------|------|------|------|--|
|  |    |      |      |      |      |      |  |
|  | 48 | 17.6 | 25.2 | 28.8 | 19.5 | 9.36 |  |
|  |    |      |      |      |      |      |  |

## ARITHMETIC STRATEGIES

Multiplying using the distributive property.

$$\begin{aligned}5 \times 37 &= 5 \times (30 + 7) \\ &= 150 + 35 \\ &= 185\end{aligned}$$

1.  $6 \times 42$

2.  $7 \times 93$

3.  $5 \times 75$

4.  $315 \times 3$

5.  $812 \times 4$

6.  $46 \times 3$

7.  $81 \times 7$

8.  $1.25 \times 4$

9.  $7.36 \times 2$

10.  $3.4 \times 7$

## APPLICATIONS

Sanjit has an agreement with the bank which means that he can spend more money than he actually has in his account.

1. Sanjit has \$250 in his account. He withdraws \$450.  
How much does he now have in his account?

\_\_\_\_\_

2. Sanjit now banks his salary of \$325.  
How much does he now have in his account?

\_\_\_\_\_

3. Sanjit spends \$200 using his EFTPOS card.  
How much does he now have in his account?

\_\_\_\_\_

4. Sanjit makes a further deposit of \$80.  
How much does he now have in his account?

\_\_\_\_\_

## DIVISION STRATEGIES

Changing into a simpler number.

$$\begin{array}{ll} 24 \div 8 & \text{divide both by 2} \\ 12 \div 4 & \text{divide both by 2 again} \\ \hline 6 \div 2 = 3 & \text{The Answer} \end{array}$$

Changing to multiplication

$$\begin{array}{l} 84 \div 6 \\ 6 \times \underline{\quad} = 84 \text{ or } 3 \times \underline{\quad} = 42 \\ \hline 6 \times 14 = 84 \quad 3 \times 14 = 42 \end{array}$$

Divide the following:

1.  $36 \div 9$
2.  $64 \div 8$
3.  $192 \div 16$
4.  $648 \div 24$
5.  $360 \div 24$

Rewrite these as multiplications:

6.  $42 \div 7$
7.  $84 \div 12$
8.  $128 \div 8$
9.  $63 \div 9$
10.  $45 \div 5$

## FRACTIONS, DECIMALS AND PERCENTAGES

Complete the table below.

| Fraction      | Decimals | Percentages |
|---------------|----------|-------------|
| $\frac{3}{5}$ |          |             |
|               | 0.12     |             |
|               |          | 18%         |
| $\frac{1}{8}$ |          |             |
|               | 1.25     |             |
|               |          | 45%         |

# BLUE - Worksheet 14

## ODD ARITHMETIC

Calculate the answer to these. You might need help from a calculator.

1.  $7 + 3^6$

|   |
|---|
| = |
|---|

6.  $2^7 \times 6^3 - 9$

|   |
|---|
| = |
|---|

2.  $3 + (9 \times 7)^2$

|   |
|---|
| = |
|---|

7.  $(4 + 9 + 1 + 3)^3$

|   |
|---|
| = |
|---|

3.  $(6^4 - 5) \times 5$

|   |
|---|
| = |
|---|

8.  $5^6 + 4^6 + 8^6 + 8^6 + 3^6 + 4^6$

|   |
|---|
| = |
|---|

4.  $(1 + 2^8) \times 5$

|   |
|---|
| = |
|---|

9.  $9^7 + 9^7 + 2^7 + 6^7 + 3^7 + 1^7 + 5^7$

|   |
|---|
| = |
|---|

5.  $(3^6 + 8) \times 5$

|   |
|---|
| = |
|---|

10.  $8^8 + 8^8 + 5^8 + 9^8 + 3^8 + 4^8 + 7^8 + 7^8$

|   |
|---|
| = |
|---|

## COUNTER EXAMPLES

A counter example is used to disprove a mathematical statement.

e.g. "When multiplying by 10, just add a zero."

Counter Example: " $4.72 \times 10 \neq 4.720$ " *disproves the statement.*

Give a counter example for each of these statements about decimals:

1. "A longer number means a larger number."

---

2. "Putting zeros in front of a number makes no difference to the value."

---

3. "Numbers are things that you use to count."

---

## COMPARING DECIMAL NUMBERS

Write the value of the 5 in each of these numbers.

1. 4138.56

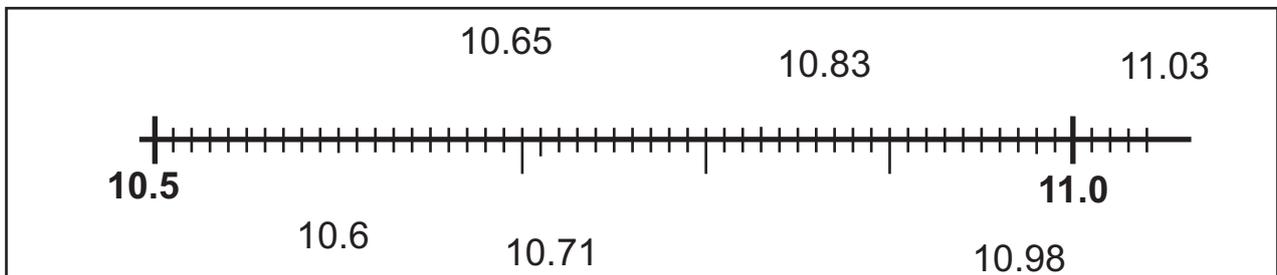
3. 35.83

2. 126.05

4. 507.89



5. Locate each number on the number line.



6. Use a greater than (>), equals (=), or less than (<), to make each statement true.

9.0 \_\_\_ 9.06

55.10 \_\_\_ 55.01

15.41 \_\_\_ 16.60

2.34 \_\_\_ 4.12

0.20 \_\_\_ 0.03

13.7 \_\_\_ 13.08

10 \_\_\_ 0.23

80.03 \_\_\_ 80.3

3 \_\_\_ 3.0

### IMPORTANT DECIMAL FRACTIONS

Complete the decimals and fractions.

$\frac{1}{2} = \frac{5}{10} =$  \_\_\_\_\_

$\frac{1}{5} = \frac{\quad}{100} =$  \_\_\_\_\_

$\frac{1}{4} = \frac{\quad}{100} =$  \_\_\_\_\_

$\frac{2}{5} = \frac{\quad}{100} =$  \_\_\_\_\_

$\frac{3}{4} = \frac{\quad}{100} =$  \_\_\_\_\_

$\frac{3}{5} = \frac{\quad}{100} =$  \_\_\_\_\_

$\frac{1}{8} = \frac{\quad}{1000} =$  \_\_\_\_\_

$\frac{4}{5} = \frac{\quad}{100} =$  \_\_\_\_\_

## MORE DECIMALS AND FRACTIONS

Write these decimals in simplest fraction form.

1.  $0.88 = \frac{88}{100} =$

5.  $0.825 =$

2.  $0.375 =$

6.  $0.025 =$

3.  $0.15 =$

7.  $0.005 =$

4.  $0.04 =$

8.  $0.125 =$

9. Round these numbers to each of the decimal places indicated.

|       | 1 decimal place | 2 decimal places |
|-------|-----------------|------------------|
| 1.541 | _____           | _____            |
| 4.328 | _____           | _____            |
| 6.255 | _____           | _____            |
| 0.198 | _____           | _____            |
| 3.091 | _____           | _____            |

10. Write a cheque for \$125.48 to the Maths Department. Then complete the cheque stub. You might have to research what a cheque is.

|   |   |
|---|---|
| Cheque 13836<br>Date _____<br>To _____<br>For _____<br>Previous Balance \$228.76<br>Deposit _____<br>This cheque _____<br>Balance _____ |  <b>Bank Kiwi</b><br>Mission Beach<br>Auckland <div style="float: right;">date _____</div> Pay _____<br>The sum of _____ \$ _____<br>_____<br>_____<br><div style="display: flex; justify-content: space-between;"> <span>13836 091587 0024742 00</span> <span>K Freeman</span> </div> |
|---|---|

# THE PROBLEM WITH MOST MATHS EXAMS.

Complete each of the decimal arithmetic sums.  
Use the letter beside each sum to crack the code below.

$$\begin{array}{r} 1.4 \\ + 2.3 \\ \hline \end{array}$$

**A** \_\_\_\_\_

$$\begin{array}{r} 38.86 \\ + 1.25 \\ \hline \end{array}$$

**E** \_\_\_\_\_

$$\begin{array}{r} 7.052 \\ 0.143 \\ + 2.585 \\ \hline \end{array}$$

**T** \_\_\_\_\_

$$\begin{array}{r} 4.26 \\ - 2.35 \\ \hline \end{array}$$

**U** \_\_\_\_\_

$$\begin{array}{r} 16.32 \\ - 8.75 \\ \hline \end{array}$$

**H** \_\_\_\_\_

$$\begin{array}{r} 44.19 \\ - 27.27 \\ \hline \end{array}$$

**Q** \_\_\_\_\_

$$\begin{array}{r} 0.4 \\ \times 0.3 \\ \hline \end{array}$$

**S** \_\_\_\_\_

$$\begin{array}{r} 0.45 \\ \times 6 \\ \hline \end{array}$$

**N** \_\_\_\_\_

$$\begin{array}{r} 51.8 \\ \times 0.4 \\ \hline \end{array}$$

**L** \_\_\_\_\_

$5.9 \times 10 =$  \_\_\_\_\_ **R**

$6.2 \times 1000 =$  \_\_\_\_\_ **O**

$58.14 \times 100 =$  \_\_\_\_\_ **I**

$0.18 \div 0.3 =$  \_\_\_\_\_ **G**

$0.54 \div 9 =$  \_\_\_\_\_ **U**

$100 \div 0.01 =$  \_\_\_\_\_ **Y**

$18 \div 8 =$  \_\_\_\_\_ **W**

$10.5 \div 0.5 =$  \_\_\_\_\_ **V**

$21.6 \div 0.3 =$  \_\_\_\_\_ **B**

$9.\overline{78}$   $7.\overline{57}$   $40.\overline{11}$   $16.\overline{92}$   $1.\overline{91}$   $40.\overline{11}$   $0.\overline{12}$   $9.\overline{78}$   $58\overline{14}$   $62\overline{00}$   $2.\overline{7}$   $0.\overline{12}$

$3.\overline{7}$   $5\overline{9}$   $40.\overline{11}$   $40.\overline{11}$   $3.\overline{7}$   $0.\overline{12}$   $10\overline{000}$   $40.\overline{11}$   $2.\overline{7}$   $62\overline{00}$   $1.\overline{91}$   $0.\overline{6}$   $7.\overline{57}$

$58\overline{14}$   $9.\overline{78}$   $0.\overline{12}$   $9.\overline{78}$   $7.\overline{57}$   $40.\overline{11}$   $3.\overline{7}$   $2.\overline{7}$   $0.\overline{12}$   $2.\overline{25}$   $40.\overline{11}$   $5\overline{9}$   $0.\overline{12}$

$10\overline{000}$   $62\overline{00}$   $0.\overline{06}$   $7.\overline{57}$   $3.\overline{7}$   $2\overline{1}$   $40.\overline{11}$

$9.\overline{78}$   $5\overline{9}$   $62\overline{00}$   $0.\overline{06}$   $7\overline{2}$   $20.\overline{72}$   $40.\overline{11}$   $2.\overline{25}$   $58\overline{14}$   $9.\overline{78}$   $7.\overline{57}$

# BLUE - Worksheet 15

## PERCENTAGES

1. Correct the following statement.

“ $\frac{1}{10}$  is 10% therefore  $\frac{1}{5}$  must be half and therefore 5%.”

---

2. Warren tells Jake that if you increase a price by 10%, then decrease it by 10% you must end up with the price you first started with. Is Warren correct?
- 

Calculate the following

3. 15% of \$60

---

6. 25% of \$160

---

4. 5% of \$1200

---

7. Increase \$180 by 15%

---

5. 27.5% of \$2200

---

8. Decrease \$160 by 40%

---

9. Ronan works in a clothing store. Staff in the store are allowed 20% discount off the retail price of clothing.

Calculate the discount that Ronan will receive if he purchases a \$40 shirt and the final price that he will pay for the shirt.

---

## PERCENTAGE APPLICATIONS

Jessica deposits \$5000 in her account with the bank. The bank is offering 5% interest for deposits held for 1 year.

1. If Jessica leaves the \$5000 in her account for 1 year, how much interest would she have earned?

---

2. The government taxes all interest payments at 30%. Use your answer in 1. to calculate how much tax Jessica will pay from her interest earned and how much money she will have in her account at the end of the year.

---

---

In the store "Cut Price Fabrics" there is a 15% discount on all winter materials.

3. Lambert purchases 1.8 metres of tweed costing \$25 per metre. Below is the docket for the sale. Complete all the missing spaces and calculate the final amount Lambert has to pay.

**CUT PRICE FABRICS**   
Cash Sales

Customer: Lambert Mahobe

1.8 metre Tweet @ \$25 per metre \_\_\_\_\_

15% discount \_\_\_\_\_

Amount to pay \_\_\_\_\_

## ANSWERS IN REVERSE

Answer these quick questions.

4.  $9 + 9 =$  \_\_\_\_\_  $9 \times 9 =$  \_\_\_\_\_

5.  $24 + 3 =$  \_\_\_\_\_  $24 \times 3 =$  \_\_\_\_\_

6.  $47 + 2 =$  \_\_\_\_\_  $47 \times 2 =$  \_\_\_\_\_

7.  $497 + 2 =$  \_\_\_\_\_  $497 \times 2 =$  \_\_\_\_\_

## MULTIPLICATION PALINDROMES

8.  $12 \times 42 = 24 \times 21 =$

9.  $13 \times 62 = 26 \times 31 =$

10  $34 \times 86 = 68 \times 43 =$

## WHY DOES IT WORK?

Are these fraction multiplications really correct?

Give the simplified answers and show that each answer is correct.

---

1.  $\frac{1}{4} \times \frac{8}{5} = \frac{18}{45}$

---

2.  $\frac{1}{2} \times \frac{5}{4} = \frac{15}{24}$

---

3.  $\frac{1}{6} \times \frac{4}{3} = \frac{14}{63}$

---

4.  $\frac{1}{9} \times \frac{9}{5} = \frac{19}{95}$

---

5.  $\frac{2}{6} \times \frac{6}{5} = \frac{26}{65}$

---

6.  $\frac{4}{9} \times \frac{9}{8} = \frac{49}{98}$

---

## QUICK QUESTIONS

Try and answer without a calculator.

1.  $6.4 \div 0.2 =$

2.  $56 \div 0.7 =$

3.  $0.9 \div 10 =$

4.  $85 \div 0.5 =$

5.  $7 \div 10 =$

6.  $429 \div 100 =$

7. Use a calculator to calculate:

$$\frac{19.9 - 3 \times 3.02}{12.1 - 9.9} = \underline{\hspace{2cm}}$$

8. Write down approximate values for these values:

|      |                      |      |                      |
|------|----------------------|------|----------------------|
| 19.9 | <input type="text"/> | 3.02 | <input type="text"/> |
| 12.1 | <input type="text"/> | 9.9  | <input type="text"/> |

9. Use your values from 8. to calculate the approximate answer to question 7.

10. How close is the approximate answer to the actual answer?

---

## APPLICATIONS

1. Clarice wants to go to Singapore for a holiday. At the bank she changes NZ\$500 to Singapore currency. The exchange rate is S\$1 = NZ\$0.96. How much Singapore money did she receive?

---

2. Boxes of maths textbooks weigh 15.25 kg. If the cardboard box weighs 0.25 kg and there are 30 books in a box, how much does each book weigh?

---

3. Here is part of a bank account statement that has not been fully calculated. Each withdrawal and deposit should be balanced. Fill in the missing 5 balances.

| Date    | Particulars     | Withdrawal | Deposit  | Balance  |
|---------|-----------------|------------|----------|----------|
|         | Balance Forward |            |          | \$588.60 |
| July 10 | Rent            | \$290      |          |          |
| 14      | Wages           |            | \$525.77 |          |
| 16      | Petrol          | \$88.55    |          |          |
| 17      | Rent            | \$290      |          |          |
| 19      | Clothes         | \$99.90    |          |          |

4. According to the newspaper, New Zealand families open the refrigerator 27 times a day. Is this number reasonable? Explain your answer.

---

---

5. Look at the numbers below. Can you give the next number in the sequence? Explain your answer.

**4      12      28**

---

---

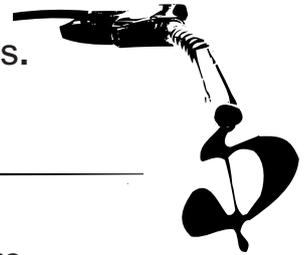
---

---

# BLUE - Worksheet 16

1. If petrol costs \$1.98 per litre, calculate the cost of 12 litres.

\_\_\_\_\_



2. Gwyneth fills up the petrol tank in her car at \$1.98 per litre. If it costs her \$88.11, how many litres of petrol does she purchase?

\_\_\_\_\_

3. Write down the next 3 prime numbers greater than 29.

\_\_\_\_\_

4. Write the number 805 in words.

\_\_\_\_\_

5. Write the number one hundred thousand and sixty three in figures.

\_\_\_\_\_

6. Look at the numbers 6432, 3015, 566, 3107, 727.  
Write the numbers in ascending order.

\_\_\_\_\_

7. Write down the next four numbers in the sequence

1, 7, 13, 19, 25,

\_\_\_\_\_

8. Calculate the cost of 2 breakfasts, 1 with tea and 1 with coffee.

---



---



---

## Kim's Cafe

Tea \$1.70  
 Coffee: \$3.50  
 Breakfast: \$18.95  
 Today's Special: \$15.99



9. How many combinations of tea and coffee can be purchased for \$10?

---



---



---

10. Calculate the cost of "Today's Special" if it has been reduced by 25%.

---

11. Write 25% as a fraction. \_\_\_\_\_

12. Paris puts \$248 into a new Kiwi Saver Account.  
 At the end of each year the bank guarantees to add 4% interest.

However at the end of each year Paris pays tax of 18% on interest earned.

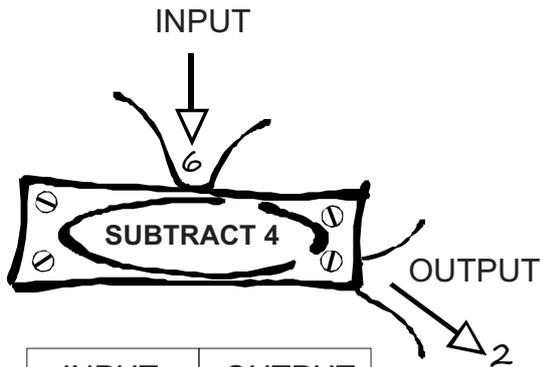
At the end of the first and second years, Paris' parents add \$500 to the account.

Complete the table below to calculate how much Paris will have in the account at the end of the 3 years.

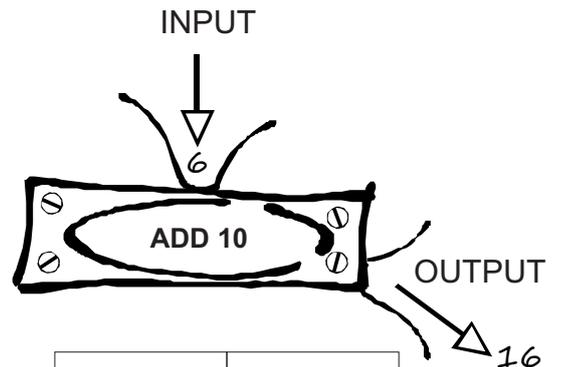
|               | Amount | Interest Received               | Interest Taxed | New Total |
|---------------|--------|---------------------------------|----------------|-----------|
| <b>Year 1</b> | \$248  | $\$248 \times 0.04$<br>= \$9.92 |                |           |
| <hr/>         |        |                                 |                |           |
| <b>Year 2</b> |        |                                 |                |           |
| <hr/>         |        |                                 |                |           |
| <b>Year 3</b> |        |                                 |                |           |
| <hr/>         |        |                                 |                |           |



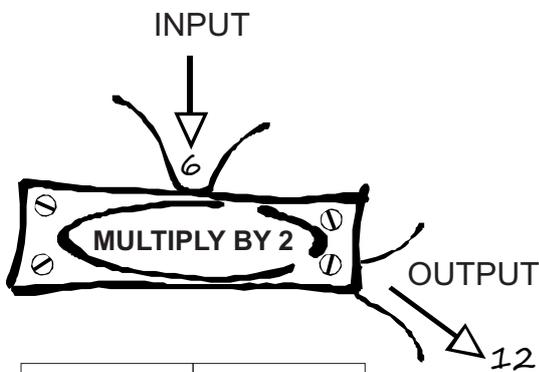
15. The diagrams below show different function machines. Numbers are input into the function machine and the output number is noted. Complete the table for each machine.



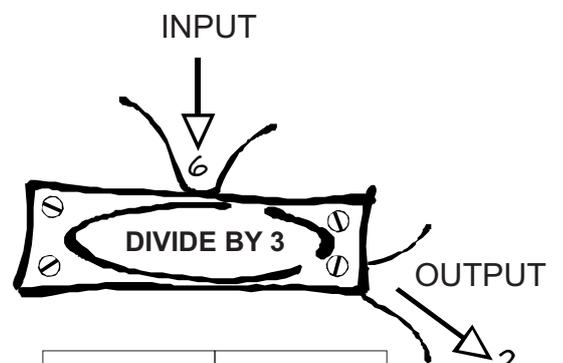
| INPUT | OUTPUT |
|-------|--------|
| -5    |        |
| 10    |        |
| 12    |        |
| 27    |        |
|       | -12    |
|       | 18     |
|       | 39     |
| n     |        |



| INPUT | OUTPUT |
|-------|--------|
| -5    |        |
| 9     |        |
| 15    |        |
| 33    |        |
|       | -12    |
|       | 8      |
|       | 27     |
| n     |        |



| INPUT | OUTPUT |
|-------|--------|
| 6     |        |
| 9     |        |
| 12    |        |
| 23    |        |
|       | 2      |
|       | 15     |
|       | 18     |
| n     |        |



| INPUT | OUTPUT |
|-------|--------|
| -12   |        |
| 9     |        |
| 18    |        |
| 48    |        |
|       | -6     |
|       | 9      |
|       | 22     |
| n     |        |

# BLUE - Worksheet 17

## AND THE GOOD NEWS IS . . . .

Below is part of a report taken from a Bangkok newspaper. Complete the report by filling in the spaces with four of the six numbers given below.

**7      39      199      289      865      12000**

Hotel worker Thanesh Narkphong, \_\_\_\_\_, has had some good news and some bad news about his jail sentence according to a report by the Thai news agency.

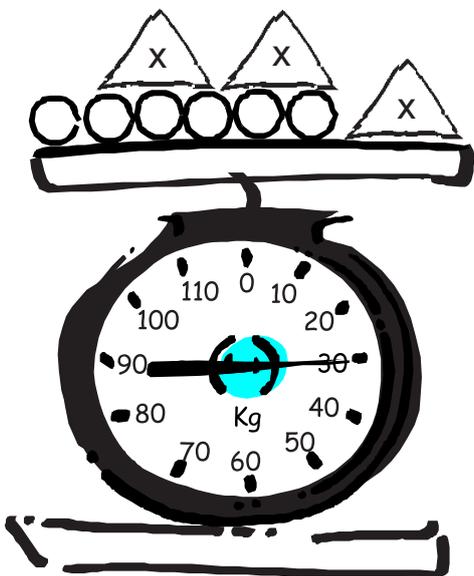
The good news was that his prison sentence for embezzling about \$ \_\_\_\_\_ was cut yesterday by the appeals court.

The bad news was that the \_\_\_\_\_ year jail sentence was only reduced to 576 years.

The sentence was reduced \_\_\_\_\_ years on the grounds that Thanesh' testimony had proven useful.

## A WEIGHTY PROBLEM

The scales below show 6 circular 1 kilogram weights along with 3 triangular weights of unknown mass (x). The mass of all the weights is 30 kilograms. Find the mass of each triangular weights.



---

---

---

---

---

---

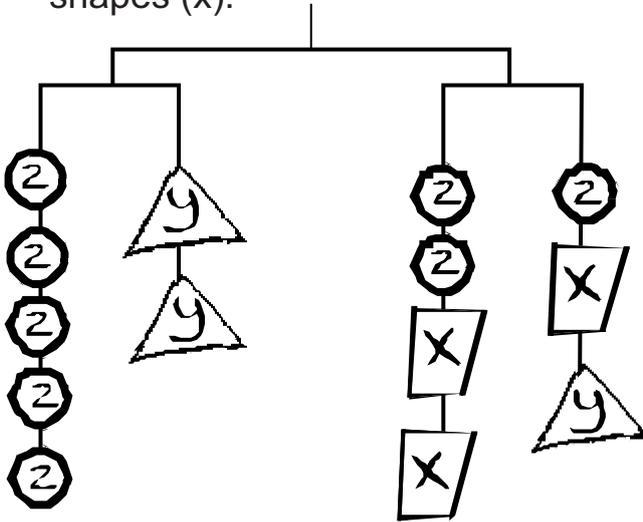
---

---

## BALANCING EQUATIONS

The following mobile is hanging from the ceiling. The weight of each of the round balls is 2 grams, the weights of the triangular ( $y$ ) and quadrilateral shapes ( $x$ ) are not known.

1. By forming equations, find the weights of the triangular ( $y$ ) and quadrilateral shapes ( $x$ ).




---



---



---

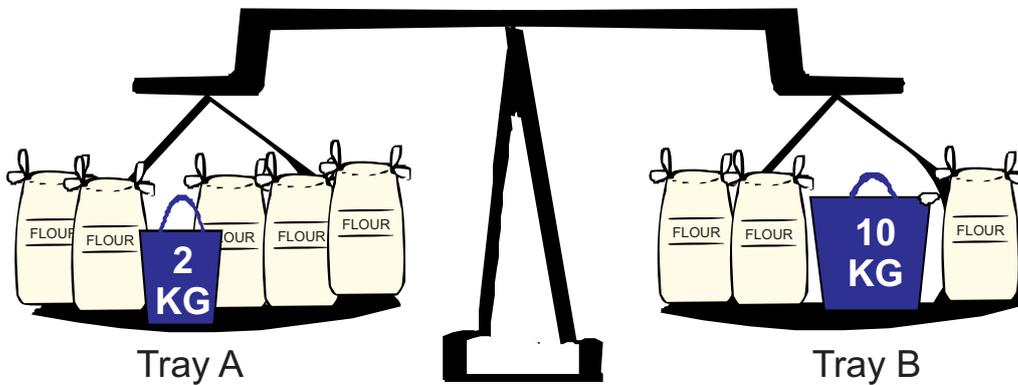


---



---

The diagram below shows a set of balance scales. On Tray A are 5 sacks of flour and a 2 kg weight. On Tray B there are 3 sacks of flour and a 10kg weight.



2. Write down two expressions - one for Tray A and one for Tray B. Use your expressions to calculate the weight of each sack of flour.

---



---



---



---



---

## ROUNDING

Use a calculator to work out the answer to each problem below.

Round your answer to 1 decimal point (1 dp).

Each time the answer appears in the code write the letter of that problem above.

$$28.64 + 15.3 + 12.85 = \underline{\hspace{2cm}} \quad \mathbf{T}$$

$$0.231 + 6.487 + 9.106 = \underline{\hspace{2cm}} \quad \mathbf{W}$$

$$103.6 + 654.2 + 185.2 = \underline{\hspace{2cm}} \quad \mathbf{R}$$

$$34.39 - 18.66 = \underline{\hspace{2cm}} \quad \mathbf{G}$$

$$123.07 - 88.58 = \underline{\hspace{2cm}} \quad \mathbf{B}$$

$$56.98 - 19.68 = \underline{\hspace{2cm}} \quad \mathbf{E}$$

$$2.4 \times 8.3 = \underline{\hspace{2cm}} \quad \mathbf{N}$$

$$6.91 \times 0.11 = \underline{\hspace{2cm}} \quad \mathbf{O}$$

$$18.6 \times 7 = \underline{\hspace{2cm}} \quad \mathbf{C}$$

$$0.063 \times 10 = \underline{\hspace{2cm}} \quad \mathbf{A}$$

$$18.41 \div 3.5 = \underline{\hspace{2cm}} \quad \mathbf{U}$$

$$0.057 \div 0.6 = \underline{\hspace{2cm}} \quad \mathbf{I}$$

$$123.6 \div 2.4 = \underline{\hspace{2cm}} \quad \mathbf{R}$$

$$58.6 \div 100 = \underline{\hspace{2cm}} \quad \mathbf{Y}$$

Sign on a teacher's door.

### FREE MATHS KNOWLEDGE

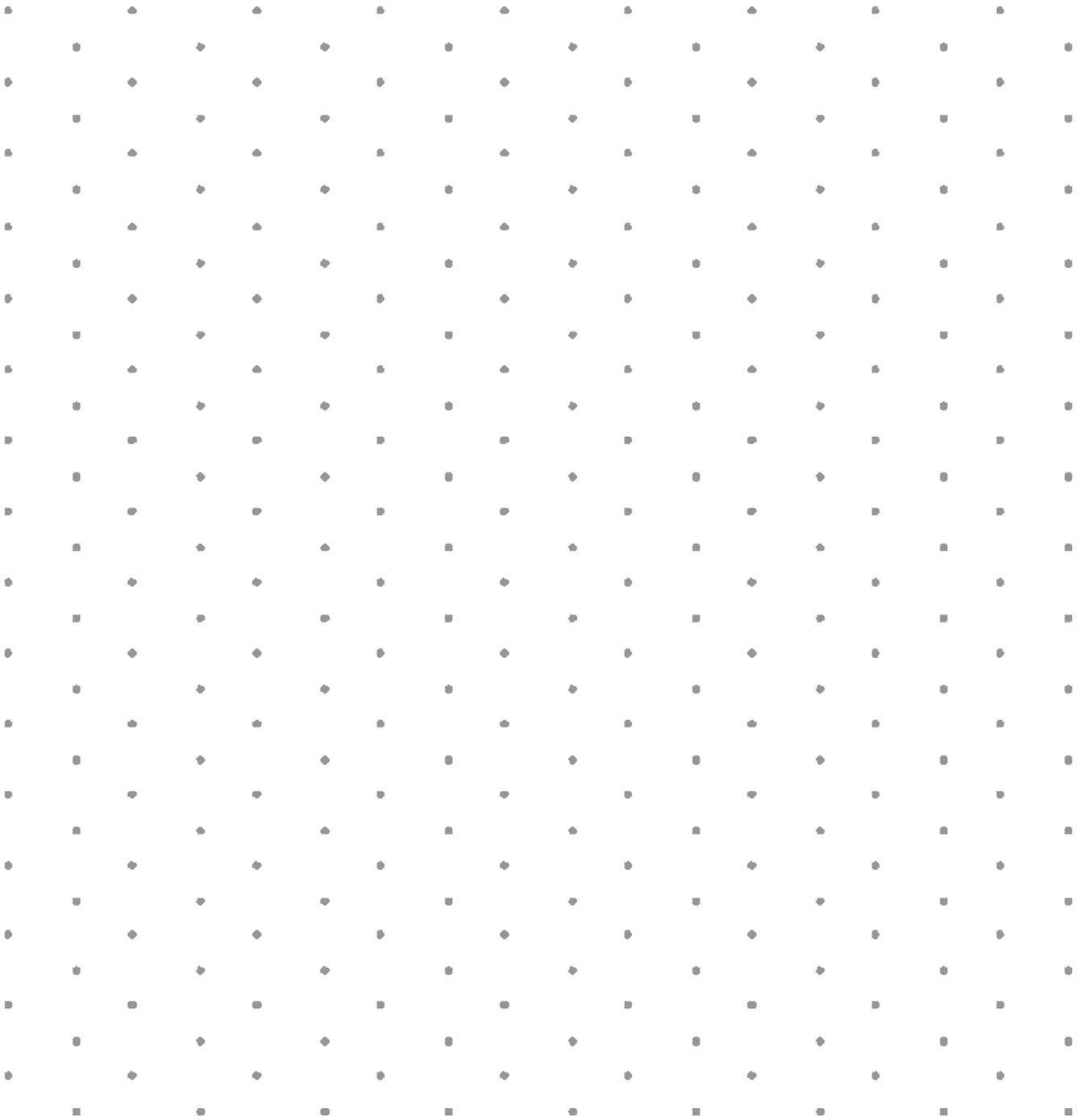
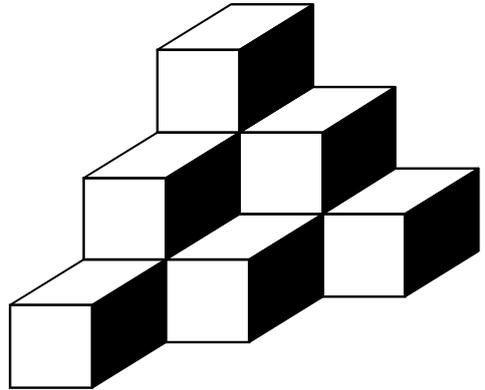
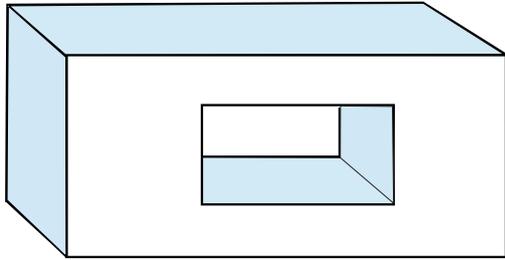
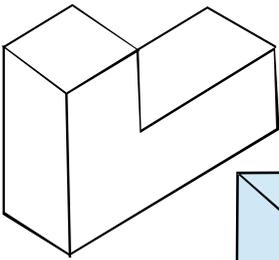
34.5 943.0 0.1 19.9 15.7

0.6 0.8 5.3 51.5

0.8 15.8 19.9 130.2 0.8 19.9 56.8 0.6 0.1 19.9 37.3 51.5

# SKETCHING SOLIDS

Redraw at least 2 of the following figures using the grid provided.



# BLUE - Worksheet 18

## HOWLERS

The following fractions are known as “howlers”. Are the answers correct? Why can't you simplify fractions this way?

$$\frac{1\cancel{6}}{\cancel{6}4} = \frac{1}{4}$$

---

$$\frac{2\cancel{6}}{\cancel{6}5} = \frac{2}{5}$$

---

$$\frac{1\cancel{0}}{\cancel{0}5} = \frac{1}{5}$$

---

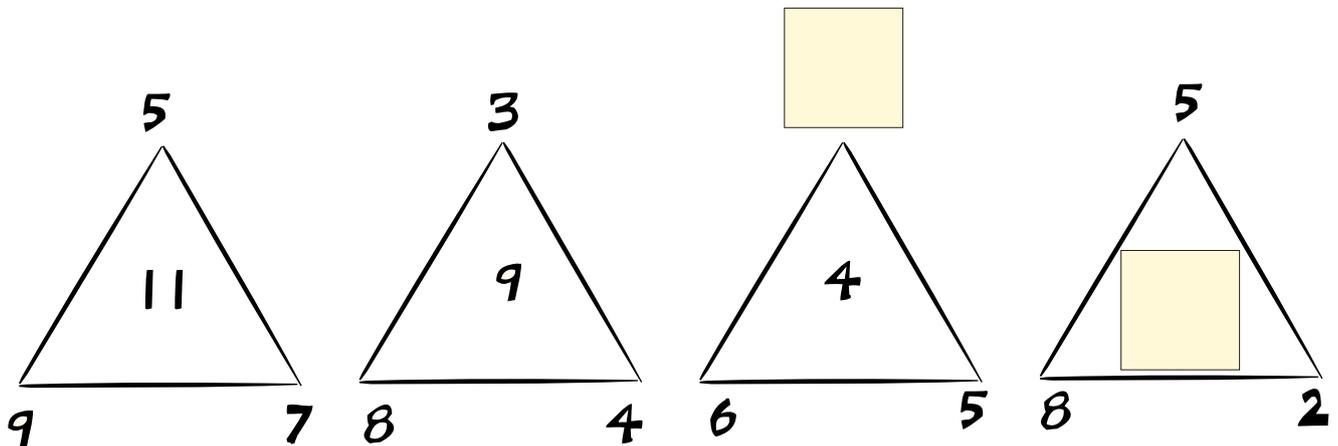
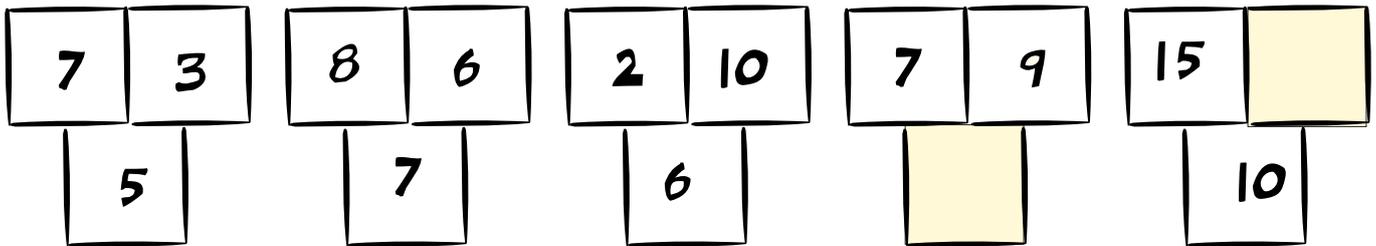
$$\frac{4\cancel{0}}{\cancel{0}8} = \frac{4}{8} = \frac{1}{2}$$

---

---

## MIND BENDERS

Find the missing numbers in the shaded boxes.



## EASY EQUATIONS

For each of the following, find the value of x.

1.  $x + 9 = 13$

\_\_\_\_\_

$x - 12 = 10$

\_\_\_\_\_

$x + 4 = 30$

\_\_\_\_\_

2.  $5x = 60$

\_\_\_\_\_

$2x = 28$

\_\_\_\_\_

$7x = 42$

\_\_\_\_\_

3.  $x - 9 = -1$

\_\_\_\_\_

$x + 7 = 5$

\_\_\_\_\_

$2 + x = 0$

\_\_\_\_\_

4.  $8x = -56$

\_\_\_\_\_

$-3x = 12$

\_\_\_\_\_

$9x = -117$

\_\_\_\_\_

5.  $x + 4 = 7.3$

\_\_\_\_\_

$x - 8.7 = 3.1$

\_\_\_\_\_

$x + 8.2 = 7.5$

\_\_\_\_\_

6.  $8x = 16.8$

\_\_\_\_\_

$7x = 24.5$

\_\_\_\_\_

$3.4x = 17$

\_\_\_\_\_

## TELLING THE TIME

Complete the following table.

24 hour time

12 hour time

|  |  |                                      |
|--|--|--------------------------------------|
|  |  | Half past eight in the morning       |
|  |  | Fifteen past noon                    |
|  |  | Twenty to two in the afternoon       |
|  |  | Twenty five past nine in the evening |

## HARDER EQUATIONS

For each of the following, find the value of x.

1.  $2x + 8 = 20$

$x = 6$

---

---

$7x + 9 = 44$

$x = 5$

---

---

$9x + 2 = 29$

$x = 3$

---

---

2.  $5x - 4 = 11$

$x = 3$

---

---

$4x - 12 = 20$

$x = 8$

---

---

$7x - 8 = 20$

$x = 4$

---

---

3.  $2x - 8 = 14$

$x = 11$

---

---

$6x - 4 = -4$

$x = 0$

---

---

$12 - 4x = -4$

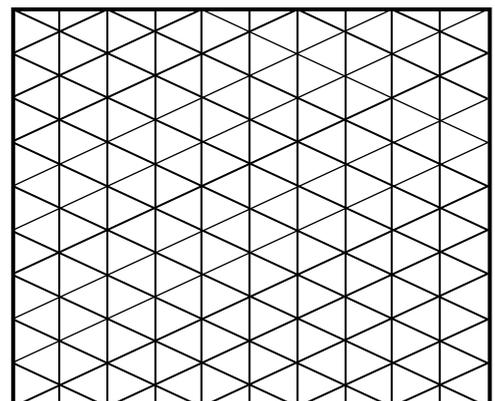
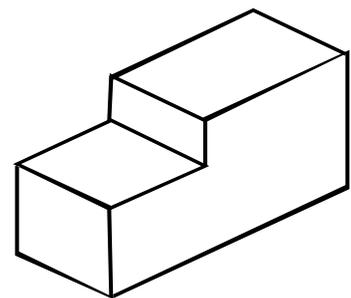
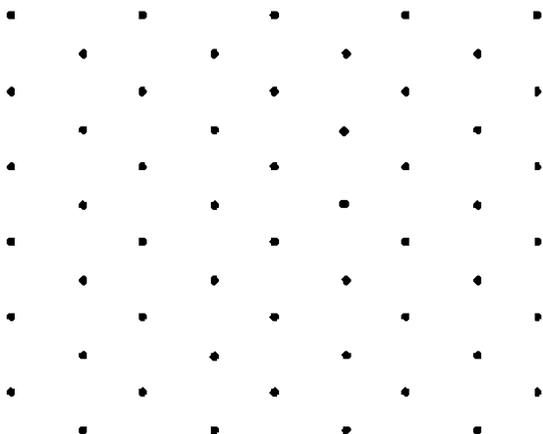
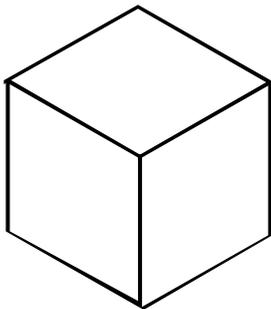
$x = 4$

---

---

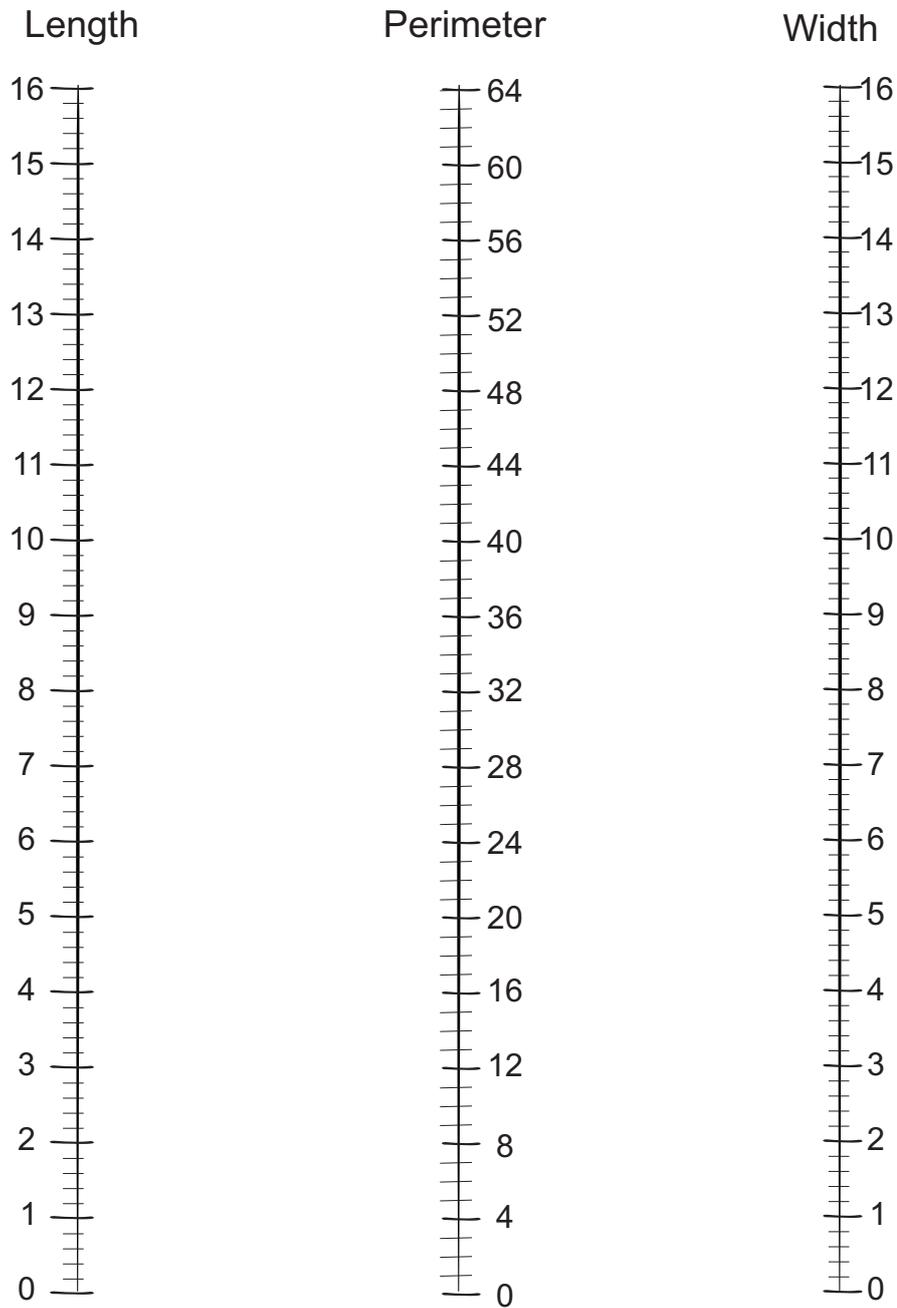
## SKETCHING SOLIDS

Redraw the figures using each of the grids provided.



### PERIMETER NOMOGRAM

The nomogram below can be helpful for working out perimeters of rectangles and squares. Place one end of your ruler on the size of the length and the other on the size of the width. Find the perimeter from the scale in the middle.



### PERIMETER NOMOGRAM

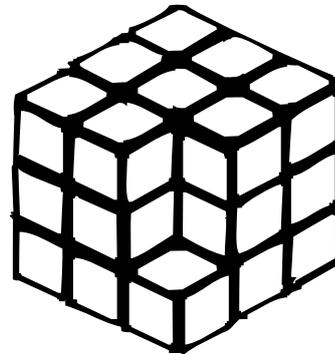
Use the nomogram to find the missing measurements of these rectangles.

|           |      |        |       |        |      |       |
|-----------|------|--------|-------|--------|------|-------|
| Length    | 14cm | 11.6cm | 12cm  | 15.8cm | 14cm | 9.5cm |
| Width     | 9cm  | 9.4cm  | 5.5cm | 4.2cm  |      |       |
| Perimeter |      |        |       |        | 50cm | 28cm  |

# BLUE - Worksheet 19

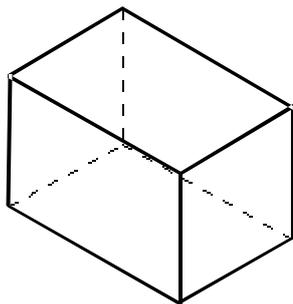
## VOLUME

If the shape on the right was made up 1 cm cubes, how many cubes would be required to build the shape?

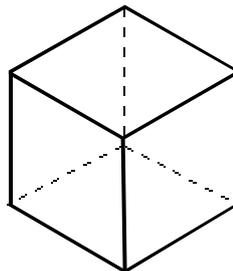


## SOLID FIGURES

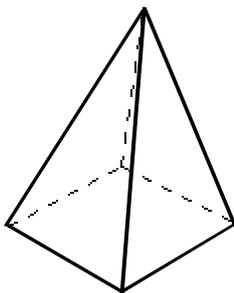
In mathematics a solid is a three dimensional geometric figure. Common solids have sides made up of polygons. These are called polyhedra (plural) or polyhedron for a singular solid. Some common solids are shown below. Name each of these solids.



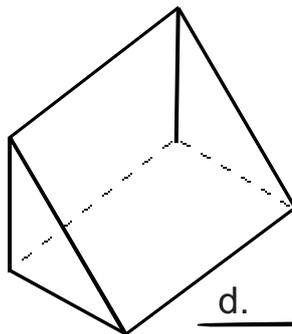
a. \_\_\_\_\_



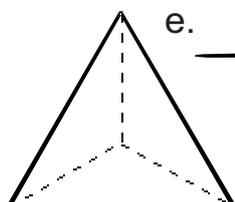
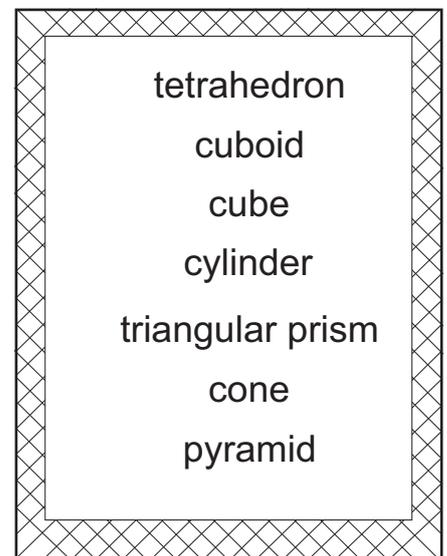
b. \_\_\_\_\_



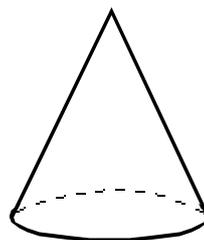
c. \_\_\_\_\_



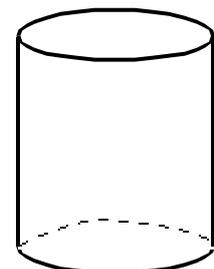
d. \_\_\_\_\_



e. \_\_\_\_\_



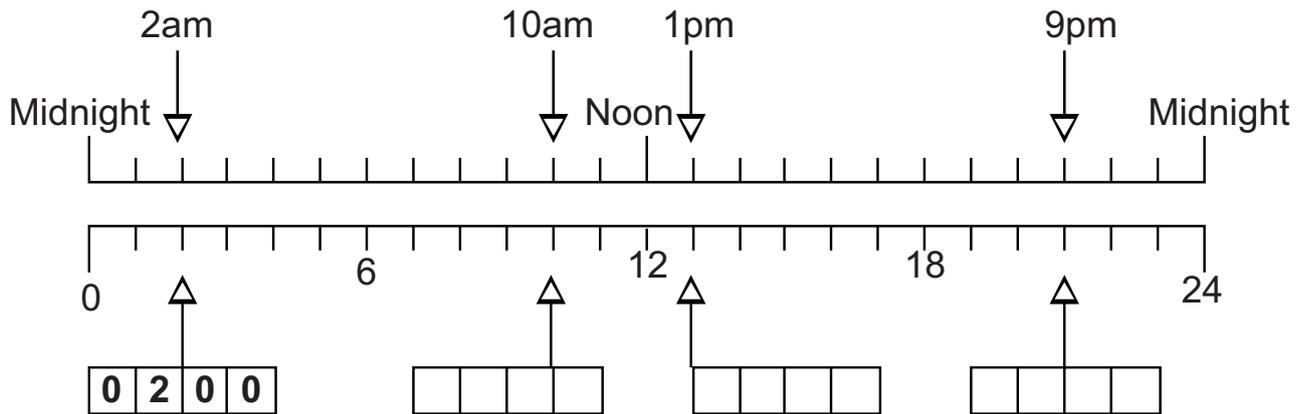
f. \_\_\_\_\_



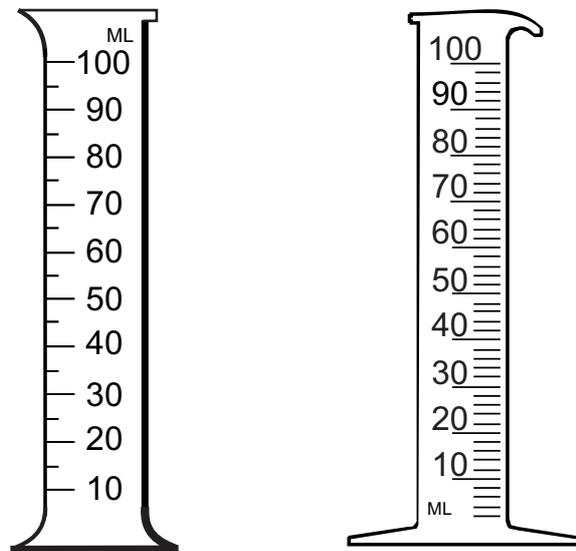
g. \_\_\_\_\_

## MEASURING AND READING SCALES

1. The scale below illustrates clock and 24 hour time. Complete the missing 24 hour times.



2. On the first beaker mark 25 ml.  
On the second beaker mark 89 ml.



3. Some countries measure length using the imperial system of inches, feet, yards and miles. This system is based on fractional values. Others countries use the metric system based on units of ten of millimetres, centimetres, metres and kilometres. A typical ruler showing inch and centimetre measurements is shown above. Use the ruler to give the centimetre equivalent for each of the following.

2 inches

$2\frac{1}{2}$  inches

$3\frac{3}{4}$  inches

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Give the closest inches measurement to:

15 mm

50 mm

85 mm:

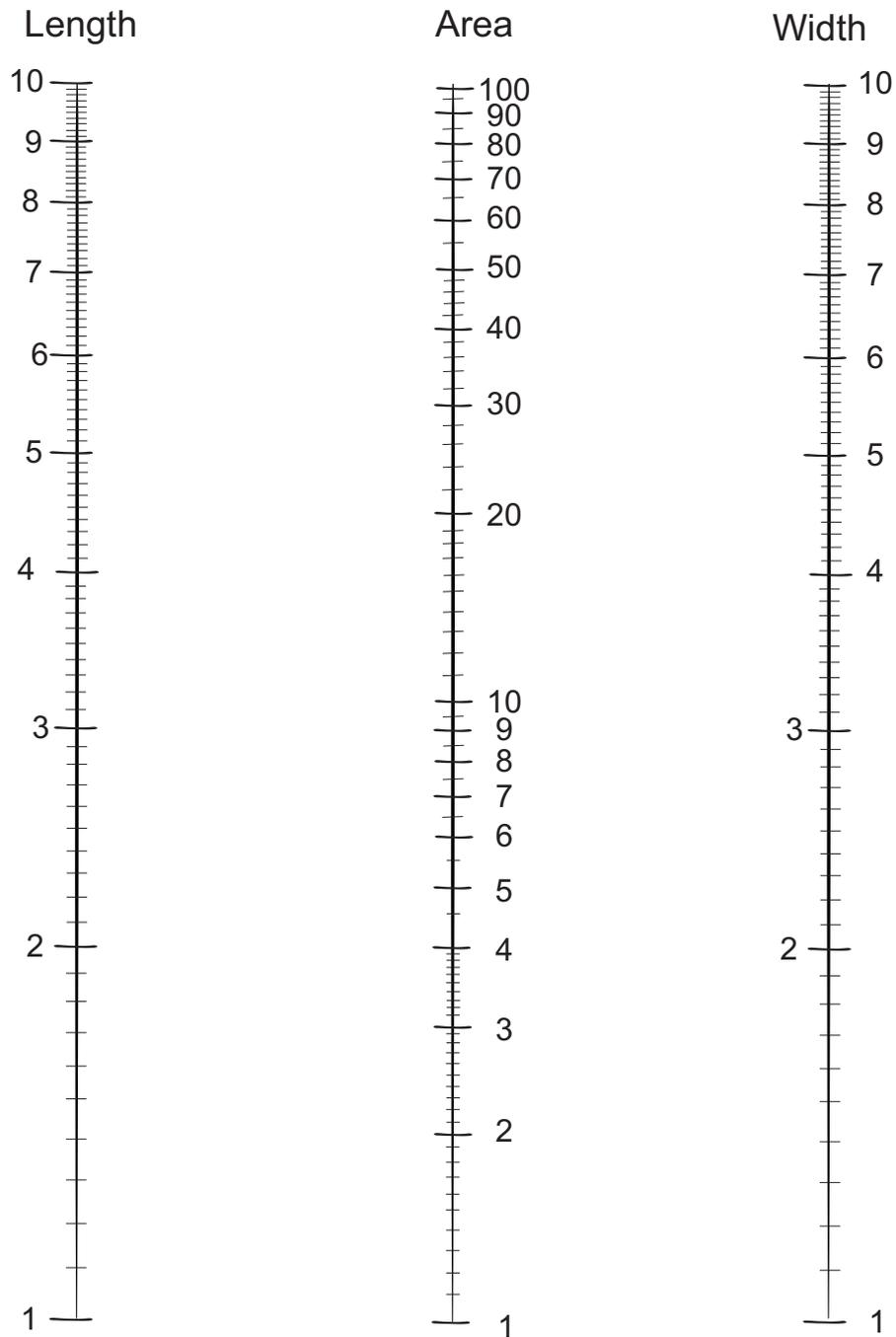
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## AREA NOMOGRAM

The nomogram below can be helpful for working out areas of rectangles and squares. Place one end of your ruler on the size of the length and the other on the size of the width. Find the area from the scale in the middle.



Use the nomogram to find the missing measurements of these rectangles.

|        |      |        |        |        |                   |                    |
|--------|------|--------|--------|--------|-------------------|--------------------|
| Length | 3 cm | 7.8 cm | 4 cm   | 1.5 cm | 5 cm              | 9.6 cm             |
| Width  | 9 cm | 5 cm   | 6.5 cm | 3.2 cm |                   |                    |
| Area   |      |        |        |        | 6 cm <sup>2</sup> | 48 cm <sup>2</sup> |

## HARDER EQUATIONS

For each of the following, find the value of x.

1.  $5(x + 8) = 55$

---

---

---

$2(3 + x) = 2$

---

---

---

$6(x - 8) = 24$

---

---

---

2.  $4(9 - x) = 20$

---

---

---

$3(x + 4) = 2(x + 7)$

---

---

---

$5(x - 7) = x + 5$

---

---

---

3.  $\frac{x}{3} + 4 = 8$

---

---

---

$\frac{x}{2} - 7 = 13$

---

---

---

$\frac{3x}{4} - 5 = 1$

---

---

---

4.  $\frac{4x}{3} + 7 = 23$

---

---

---

$\frac{1}{2}x + 10 = 35$

---

---

---

$x^2 - 12 = 52$

---

---

---

5.  $5(x^2 + 2) = 30$

---

---

---

$3\left(\frac{x}{2} - 3\right) = 6$

---

---

---

$3(x^2 + 4) = 60$

---

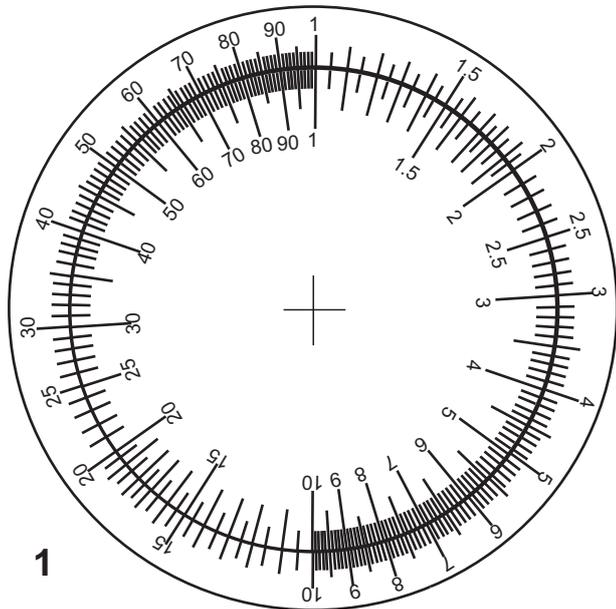
---

---

# BLUE - Worksheet 20

## THE CIRCULAR CALCULATOR

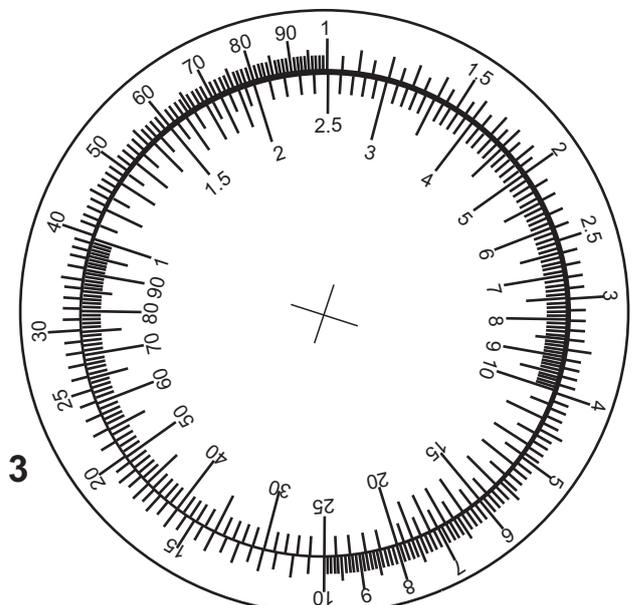
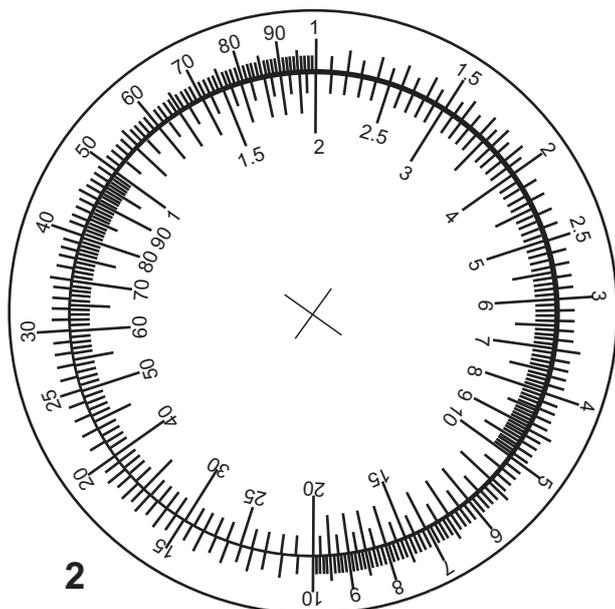
Before electronic calculators, mathematicians devised all sorts of interesting slide rules and methods for arithmetic. On the next page is a circular calculator. Glue the page onto some card and when dry cut out the two circles. Fasten the two circles through the centre so that the smaller circle can rotate around the larger.

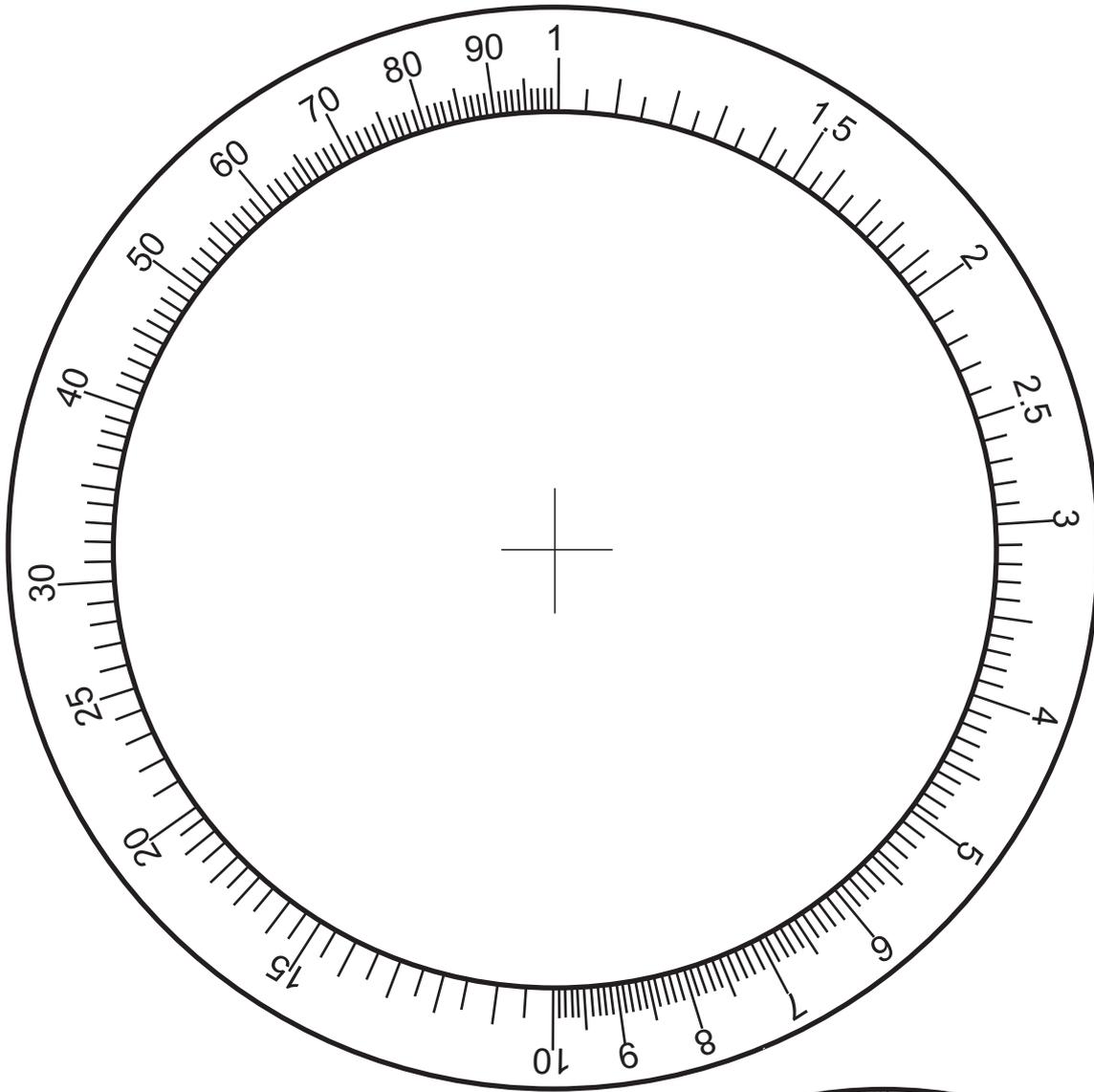


1. Place the calculator in front of you so that all the numbers on the inside dial line up with those on the outside. This is multiplying by 1.

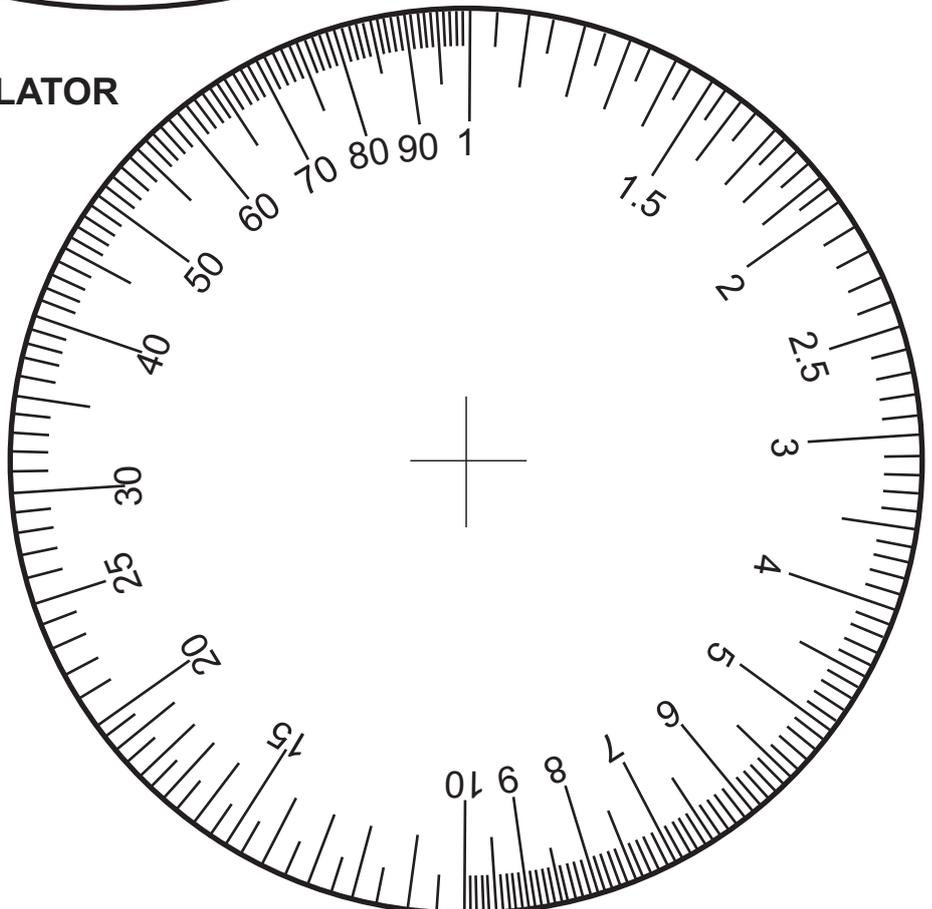
2. To multiply by 2 line up the 2 on the inside dial with the 1 on the outside dial. All the numbers on the inside are double those on the outside.

3. To multiply by 2.5 line up the 2.5 on the inside dial with the 1 on the outside dial. Can you now see how it works?





**THE CIRCULAR CALCULATOR**



## USING THE CIRCULAR CALCULATOR

Arrange the dials on your circular calculator so that you can multiply by 4.

Now use it to give the best answer for each of the following:

$$4 \times 7 = \underline{\quad\quad} \quad 4 \times 13 = \underline{\quad\quad} \quad 4 \times 15 = \underline{\quad\quad} \quad 4 \times 75 = \underline{\quad\quad}$$

Use your circular calculator to find the value of:

$$3.5 \times 2 = \underline{\quad\quad} \quad 3.5 \times 4 = \underline{\quad\quad} \quad 3.5 \times 6 = \underline{\quad\quad} \quad 3.5 \times 21 = \underline{\quad\quad}$$

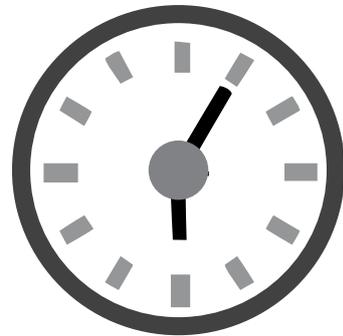
$$1.8 \times 5 = \underline{\quad\quad} \quad 18 \times 5 = \underline{\quad\quad} \quad 2.5 \times 2.5 = \underline{\quad\quad} \quad 15 \times 15 = \underline{\quad\quad}$$

The circular calculator can also be used for division.

Use it to find answers to the following:

$$45 \div 9 = \underline{\quad\quad} \quad 117 \div 9 = \underline{\quad\quad} \quad 3.9 \div 3 = \underline{\quad\quad} \quad 7.8 \div 6 = \underline{\quad\quad}$$

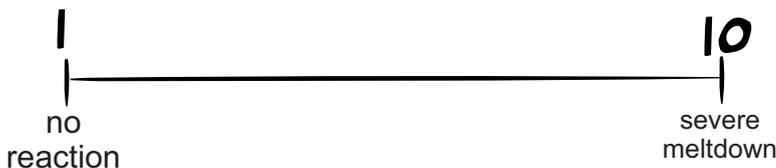
$$21 \div 3.5 = \underline{\quad\quad} \quad 45 \div 7.5 = \underline{\quad\quad} \quad 9.9 \div 9 = \underline{\quad\quad} \quad 8.1 \div 3 = \underline{\quad\quad}$$



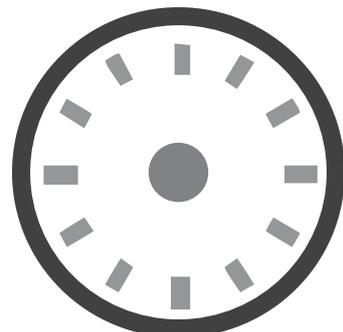
### Top 5 Questions Teachers HATE!

5. When do the holidays start?
4. What page are we on?
3. How come we have to do this?
2. Is this in the test?
1. Can we do something fun today?

Try one of them tomorrow on your teacher. Rate the reaction out of 10.

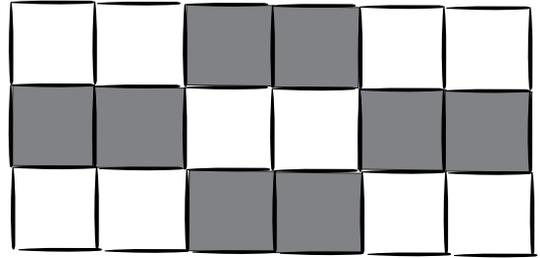


Jarella has just arrived at the train station and the clock shows the time above. The next train is in 45 minutes. On the clock face below show the time that the train should arrive.



## FRACTION AND RATIO APPLICATIONS

The panel shown is part of a mural.  
 Tiles in the panels are painted black and white in the pattern shown.



1. What fraction of the panel is painted white?  
 \_\_\_\_\_
2. What is the ratio of black to white squares that make up the panel?  
 \_\_\_\_\_
3. It takes 5 litres of paint to cover all the black squares.  
 How many litres of paint would be required to paint all the white squares?

---



---

4. The whole mural consists of fifteen panels, identical to the one shown, placed side by side on a building wall. White paint costs \$27.50 per litre, black paint costs \$28 per litre. How much will it cost to paint the whole mural?

---



---

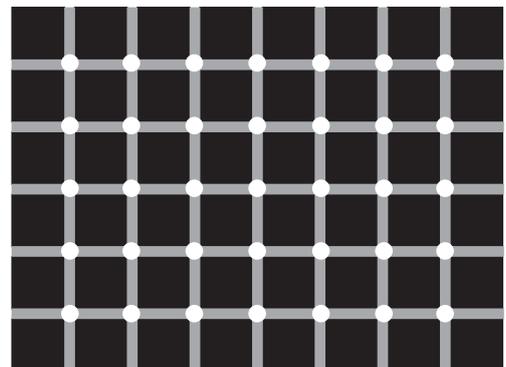


---

## THE BEAUTY OF MATHS

Calculate these sums. How long does it take you to find the pattern?

1.  $1 \times 8 + 1 =$  \_\_\_\_\_
2.  $12 \times 8 + 2 =$  \_\_\_\_\_
3.  $123 \times 8 + 3 =$  \_\_\_\_\_
4.  $1234 \times 8 + 4 =$  \_\_\_\_\_
5.  $12345 \times 8 + 5 =$  \_\_\_\_\_
6.  $123456 \times 8 + 6 =$  \_\_\_\_\_
7.  $1234567 \times 8 + 7 =$  \_\_\_\_\_
8.  $12345678 \times 8 + 8 =$  \_\_\_\_\_
9.  $123456789 \times 8 + 9 =$  \_\_\_\_\_



Stare and count the black balls.

# BLUE - Worksheet 21

## APPLICATION

1. A recent newspaper headline read “\$1 trillion to rescue Europe”. Write \$1 trillion as a number.

---

2. Krystal is buying a car. She goes to the bank and withdraws one hundred \$100 bills. The thickness of the packet is 12mm. Krystal then wonders what \$1 trillion would look like if it was made up of \$100 bills. Write a description of what \$1 trillion might look like.

---

---

---

---

---

---

---

---

3. If you spent \$1 million a day, how long would it take to spend \$1 trillion?

---

---

---

## FASCINATING FACTS: How long is 1 trillion seconds?

1 million seconds takes 11.6 days

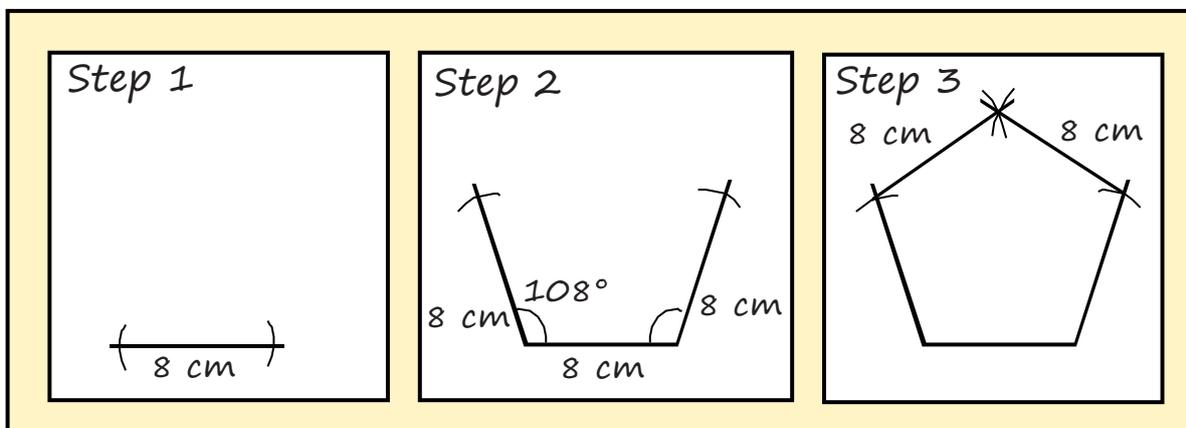
1 billion seconds takes 32 years

1 trillion seconds takes over 32,000 years

## DRAWING POLYGONS

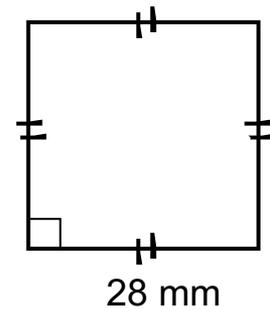
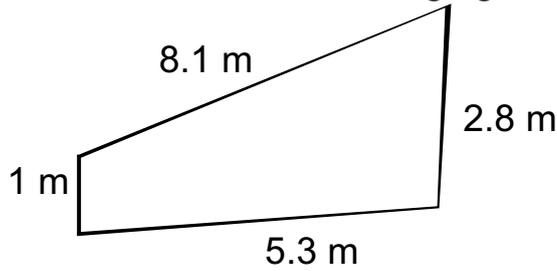
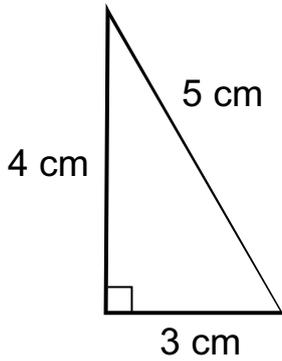
For this exercise you will need a pencil, ruler, compass and protractor.

Draw a pentagon with sides 8 cm. The steps are illustrated in the diagram below.



## PERIMETERS

1. Find the perimeters of each of the following figures.



|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

2. Find the perimeter of the following.

A rhombus with side lengths 18cm.

---

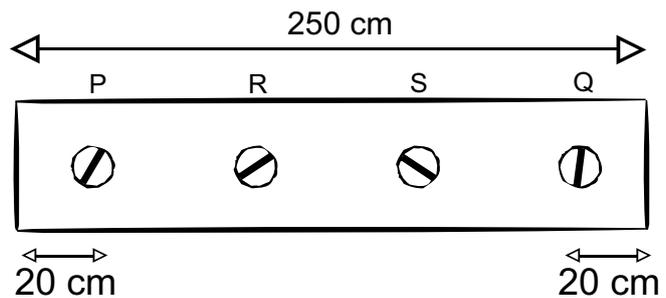
A kite with side lengths of 96 cm and 55 cm

---

An isosceles triangle with identical 15 m sides and a base of 9 m.

---

## INVESTIGATING WITH ALGEBRA



A piece of metal 250 cm long, is to be fixed to a wall with four screws. Two of the screws are placed 20cm from each end of the wood at P and Q.

1. What is the distance, in centimetres, between the centres of the screws at P and Q?

Distance = \_\_\_\_\_ cm

2. Screws are placed at R and S so that the distances between the centres of all the screws are equal. Calculate the distance between R and S.

---

## MEASURING HOW MANY

Complete the following statements.

1. \_\_\_\_\_ mm = 15 cm

2. \_\_\_\_\_ g = 5 kg

3. \_\_\_\_\_ ml = 2 litres

4. \_\_\_\_\_ cents = \$27.50

5. \_\_\_\_\_ m = 10 km

6. \_\_\_\_\_ ° = 2 right angles

7. \_\_\_\_\_ minutes = 4 hours

8. \_\_\_\_\_ weeks = 1 year

9. \_\_\_\_\_ seconds = half an hour

10. There are \_\_\_\_\_ days in January

## MEASUREMENT APPLICATION



1. A plumber is called to repair a malfunction in the school toilets at Mahobe Secondary School. The first day he is at the school for 1 hour 40 minutes and then the next day he is at the school for 2 hours and 50 minutes. What is the total time spent at the school?

---

2. The plumber measures the water from a dripping tap. After 15 minutes, 200 ml of water has been wasted. If the dripping tap is not fixed, how many litres of water will be wasted after 1 year?

---

3. In Auckland, water usage is charged at \$1.562 per cubic metre of water used ( $1 \text{ m}^3 = 1,000$  litres), while there is an additional charge of \$3.745 per cubic metre of wastewater used, (wastewater is calculated as 75% of water consumption). Using these figures, calculate how much it costs if the dripping tap is not repaired for 1 year.

---

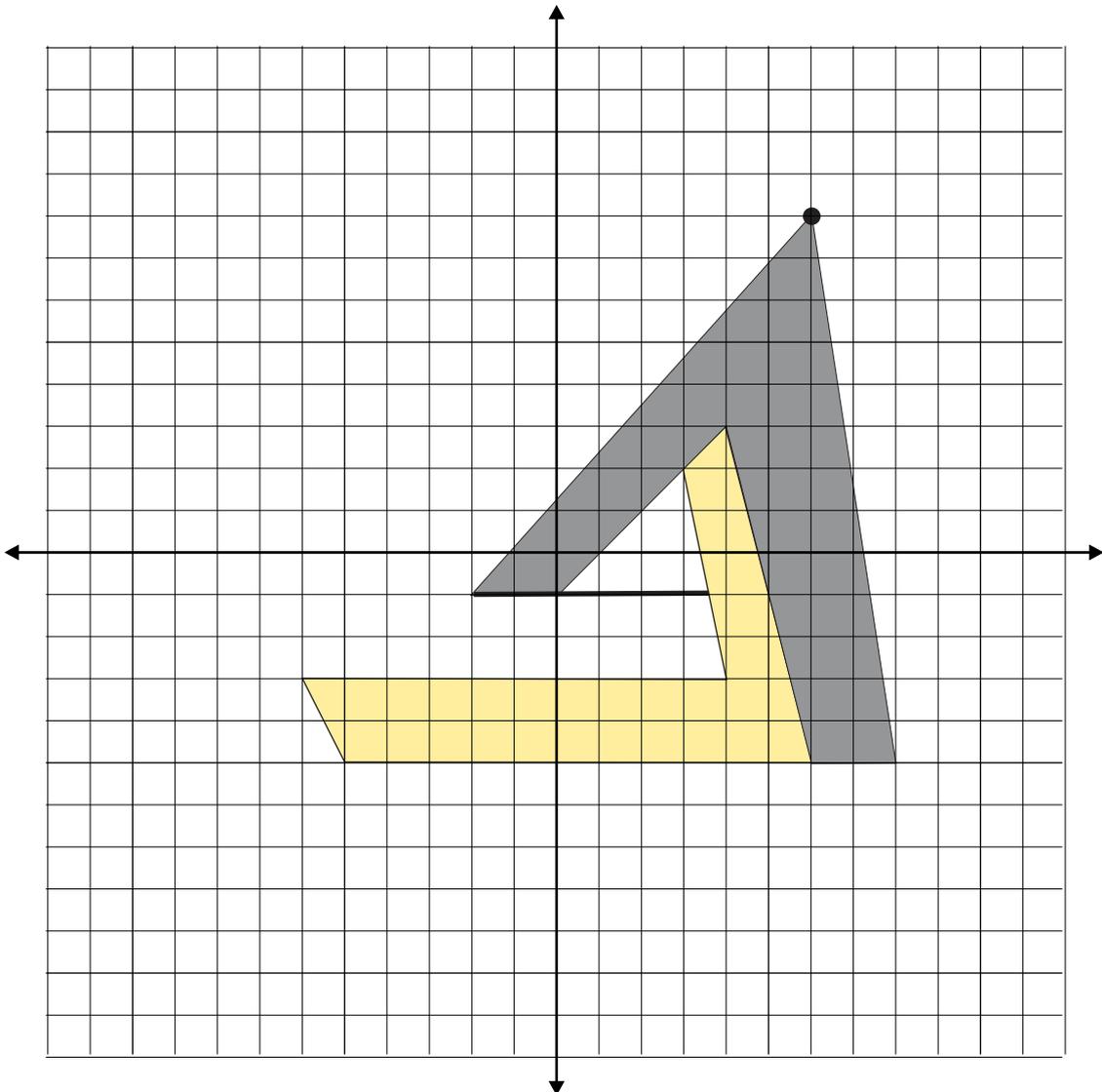
---

---

# BLUE - Worksheet 22

## COORDINATE DESIGNS

1. Label and number the axes (each square in the grid represents 1 unit).
2. Use the axes to join the following coordinate points:  
(6, 8), (3, 8), (-6, -3), (4, -3), (3, 2) in order.
3. Now, join these points:  
(-6, -3), (-5, -5), (8, -5), (6, 8), (-2, -1), (0, -1), (4, 3), (6, -5) in order.

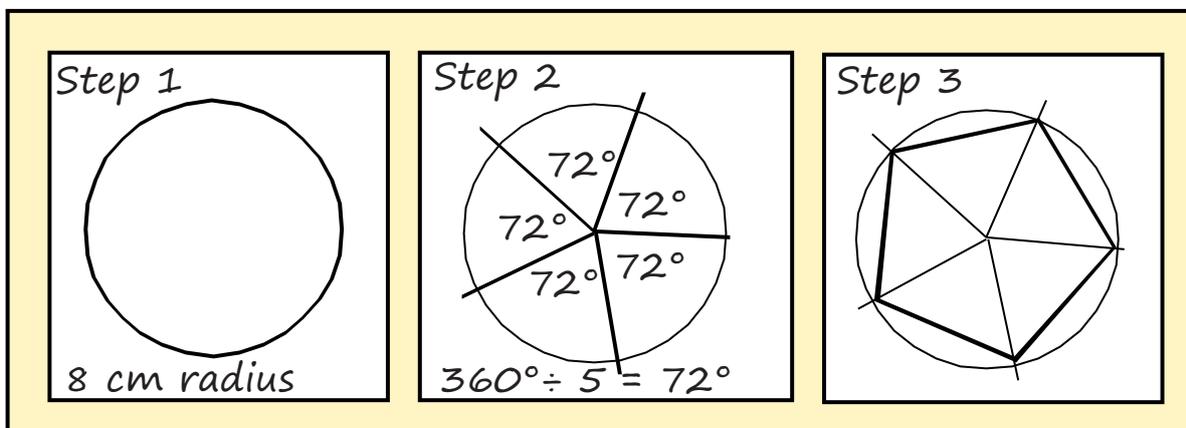


## DRAWING POLYGONS

For this exercise you will need a pencil, ruler, compass and protractor.

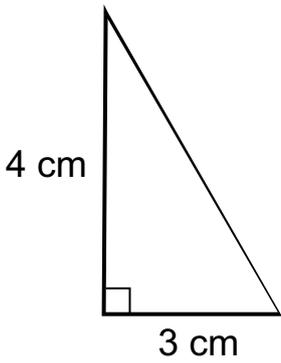
Another method for drawing a pentagon is shown.

Use this method to draw a pentagon, then measure the length of the sides.



**AREA**

1. Find the areas of each of the following figures:

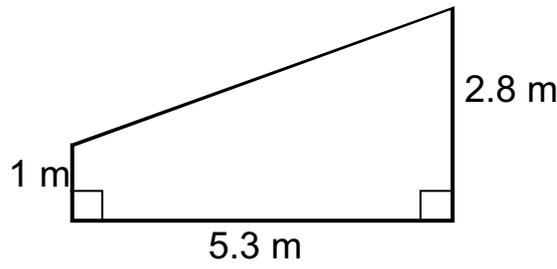



---

---

---

---

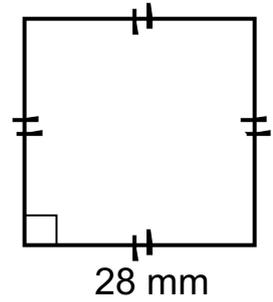



---

---

---

---

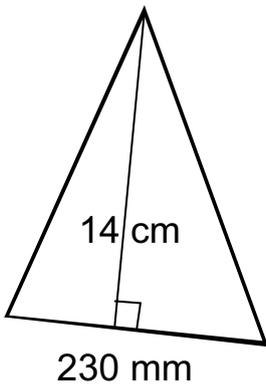



---

---

---

---

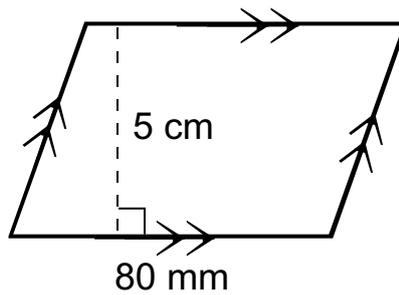



---

---

---

---

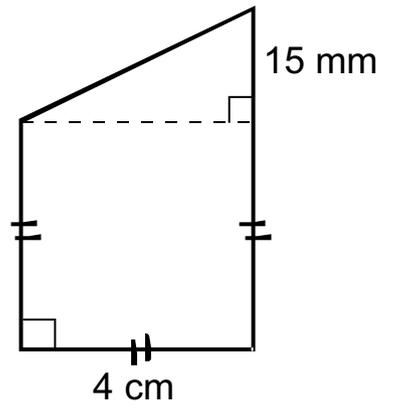



---

---

---

---




---

---

---

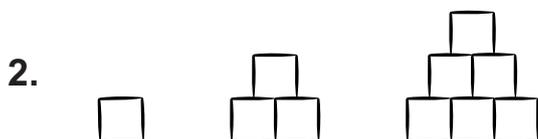
---



**PATTERNS**

What comes next?

1. 25 20 26 19 27 18 28 17 29 \_\_\_\_\_



1 3 \_\_\_\_\_ 10

## MEASUREMENT APPLICATIONS

Answer each of the following measurement questions.

1. Give the best unit to measure the following:

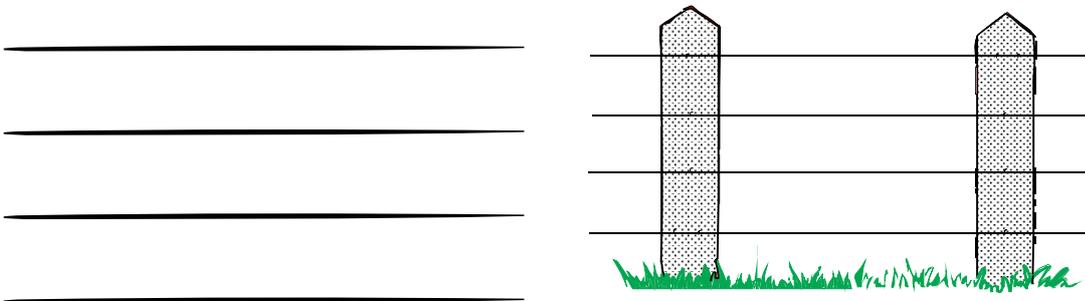
A person's waist \_\_\_\_\_

Capacity of a bucket \_\_\_\_\_

Weight of a car \_\_\_\_\_

Area of a gymnasium floor \_\_\_\_\_

2. Fence posts are placed 3 metres apart. There are 4 strands of wire that help make up the fence. If a fence has 25 posts, how much wire is needed?



3. Sensible Statements. Circle the best answer.

The height of the old kauri tree is 2 5 9 20 metres tall.

Cheyenne is 5 years old. She is 0.50 0.75 1.00 1.25 metres tall.

Cheyenne weighs 5 25 50 100 kg.

Jeeta measures one of the angles in a right angled triangle.

A possible measurement is: 65 99 105 120 degrees.

# BLUE - Worksheet 23

## ALGEBRAIC EQUATIONS

$$\begin{aligned}x &= Y \\ W &= x + Z \\ Z &= a + Y\end{aligned}$$

1. If  $x = 25$  and  $W = 125$  then find the value of  $a$

---

---

---

---

---

---

2.  $xyz = 1$   
 $x = 100$  and  $y = 50$   
Find the value of  $z$ .

---

---

---

3.  $ab = rs$   
 $a = 50$ ,  $r = 20$ ,  $b = 100$   
Find the value of  $s$

---

---

---

4.  $P = \frac{h + w}{2}$

If  $P = 25$  and  $w = 34$ , find the value of  $h$ .

---

---

5.  $R = \frac{n(n - 3)}{2}$        $S = n^2 + n$

If  $n = 10$ , find the value of  $R + S$

---

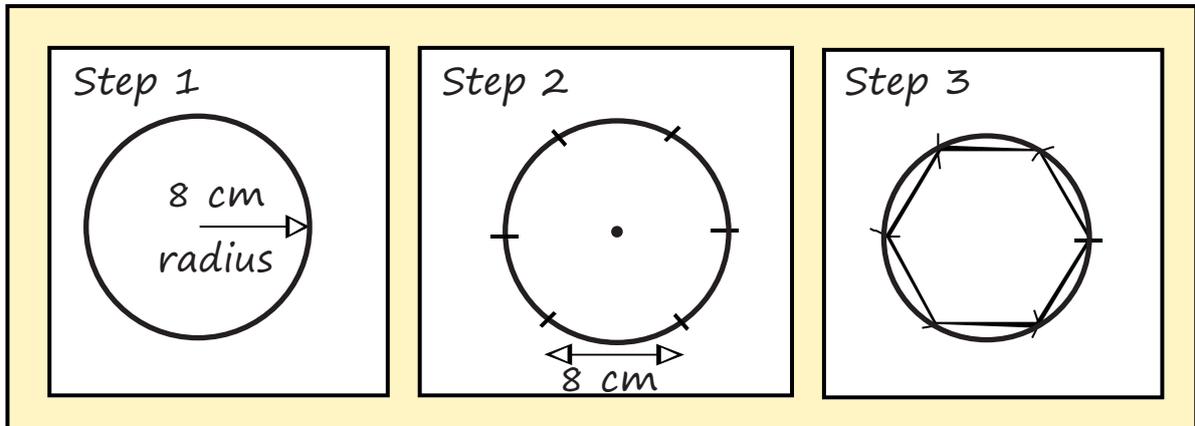
---

## DRAWING POLYGONS

For this exercise you will need a pencil, ruler and compass.

Draw a regular hexagon with sides 8 cm.

The steps are illustrated in the diagram below.



## AREA APPLICATIONS

1. A swimming pool with dimensions  $30\text{ m} \times 10\text{ m}$  is surrounded by a brick path  $2\text{ m}$  wide. Calculate the area of the path.

---

---

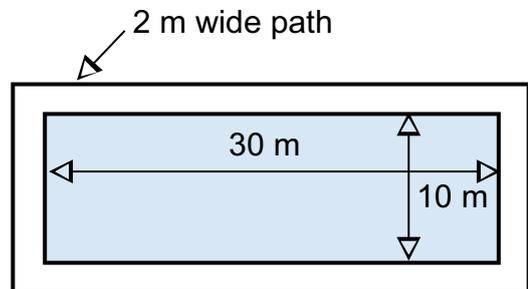
---

---

---

---

---



The Rolled Turf company sells rolls of ready made lawn. The rolls are  $0.8\text{ m}$  wide and  $2\text{ m}$  long. The plan below shows a section that needs to be covered in turf.

2. Calculate the area of the section.

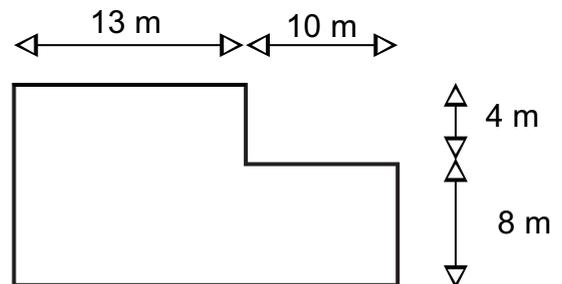
---

---

---

---

---



3. How many rolls of turf are needed to cover the section?

---

---

---

4. Turf costs  $\$18$  per roll. How much will it cost to complete the job?

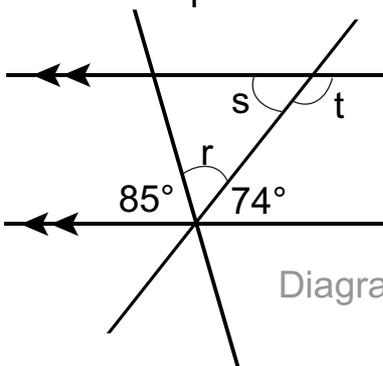
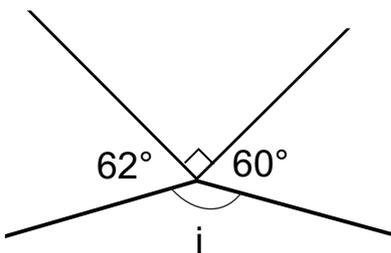
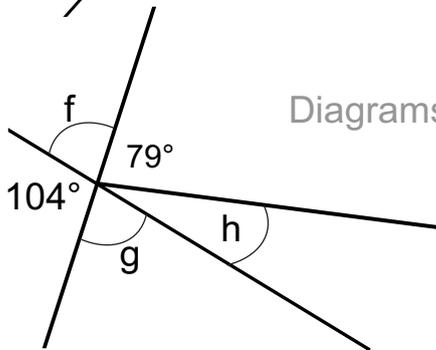
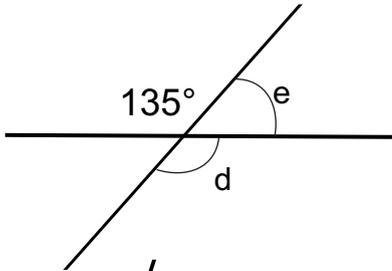
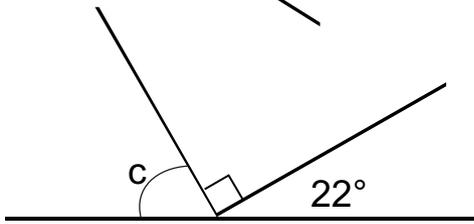
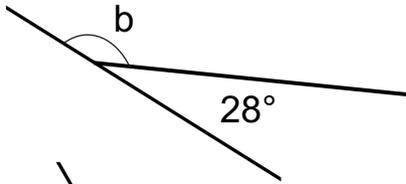
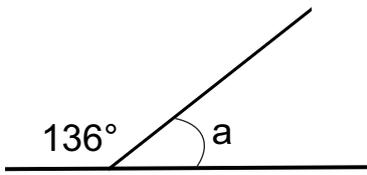
---

---

---

# ANGLES

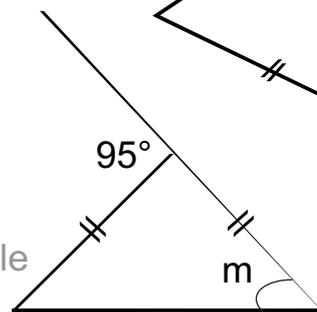
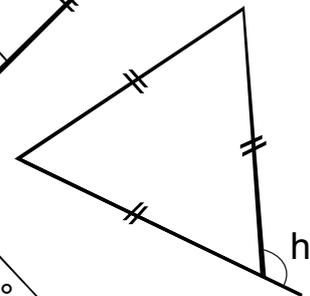
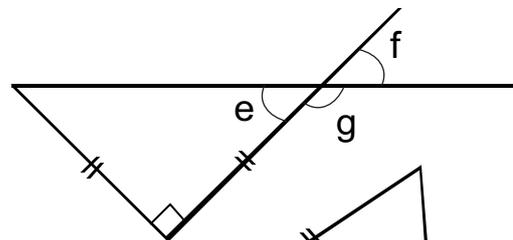
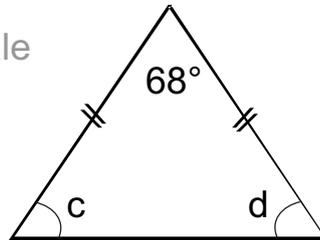
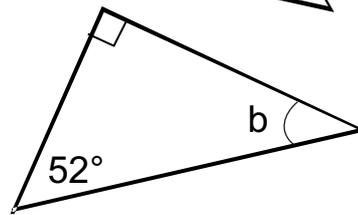
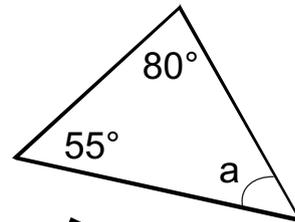
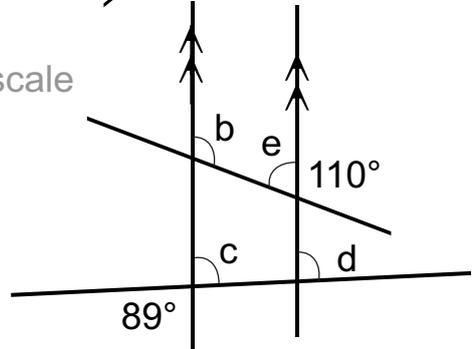
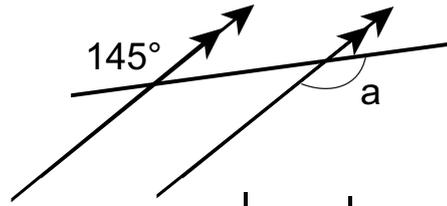
Find all the missing angles.



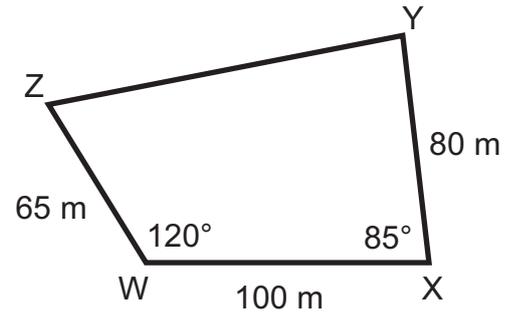
Diagrams are not to scale

Diagrams are not to scale

Diagrams are not to scale



# BLUE - Worksheet 24



## SCALE DRAWINGS

The diagram represents a field WXYZ.

1. Make a scale drawing of WXYZ on the grid below using 1 square representing  $10\text{ m} \times 10\text{ m}$ .

2. Find the length of YZ.

---

3. What is the perimeter of the field?

---

4. Use your scale diagram to calculate the area of the field.

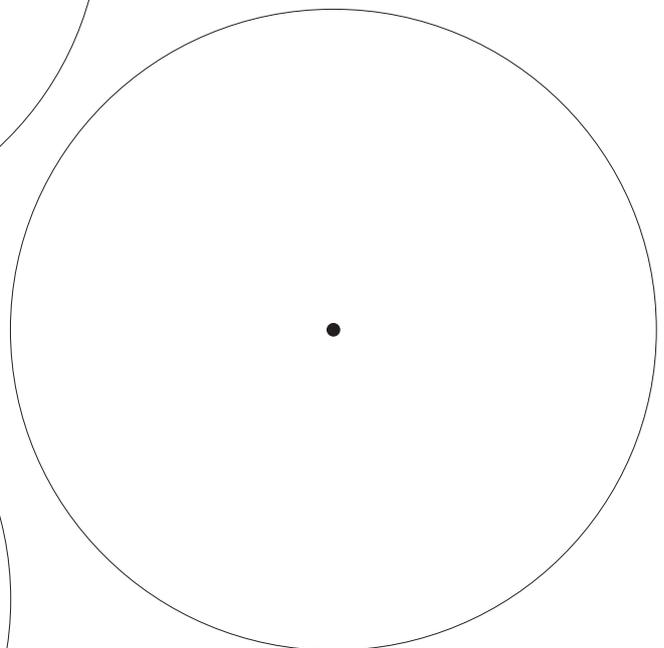
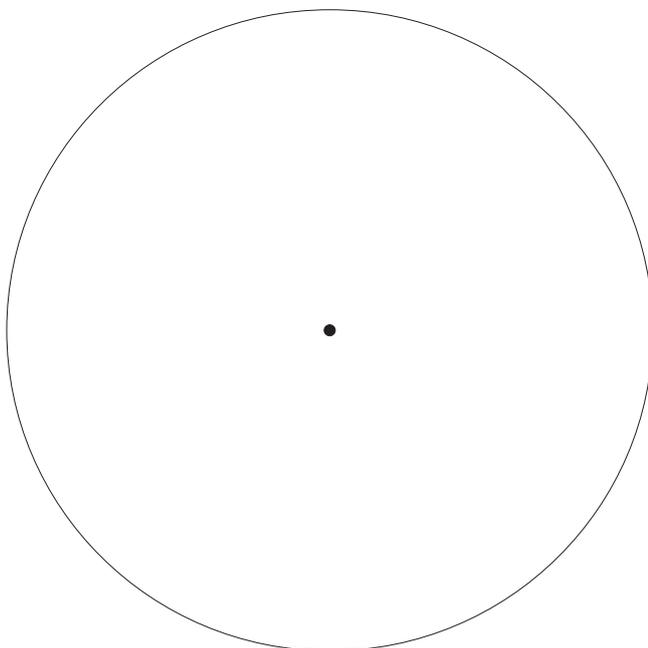
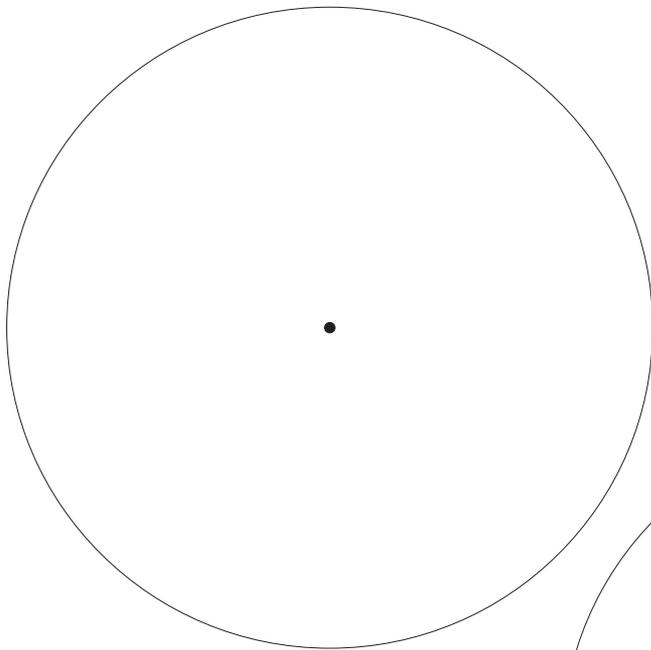
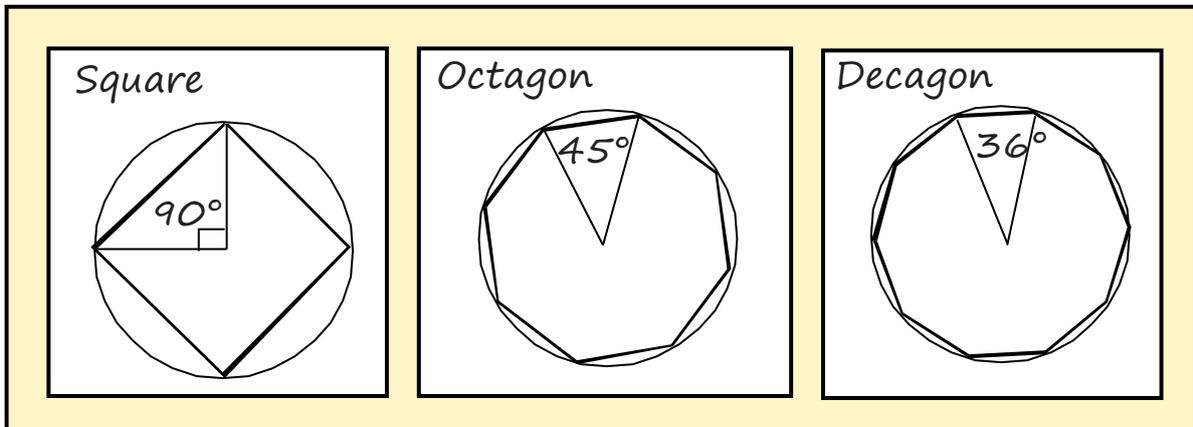
---

---



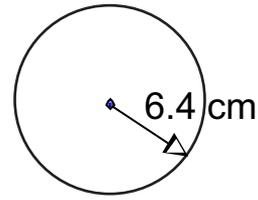
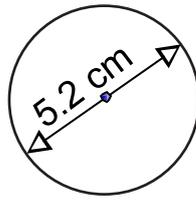
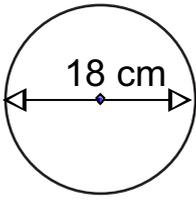
## DRAWING POLYGONS

Polygons can also be drawn by using a centre point and a circle, e.g. if a regular polygon is to be drawn, then  $360^\circ \div$  "the number of sides" = "the sector angle". Draw the following regular polygons by using the circles given below.



## CIRCUMFERENCE AND AREA

1. Calculate the circumference and area of each of the following circles:



|       |       |       |
|-------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

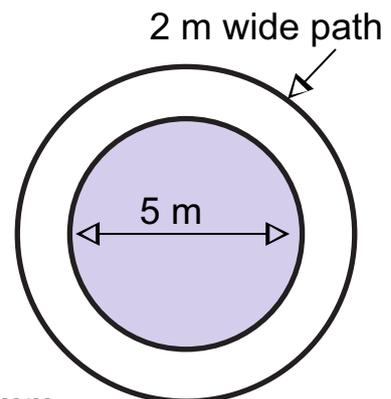
2. A circular fish pond with a diameter of 5 metres has a 2 metre path around the outside. Calculate the area of the path.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



3. The New Zealand \$1 coin has a diameter of 23 mm. Calculate the circumference of a \$1 coin.

Check your calculations by following these instructions:

- Put a pen or pencil mark on the outside of a \$1 coin and then place the coin upright on the line drawn below.
- Roll the coin along the line until the mark has completed a full circle and is back on the line.
- Mark this finishing position, then measure the distance from the start to the finish position.
- Is your measurement close to the answer you calculated?



## ANGLES

You will need a protractor for this.

1. Measure the following angles:

AOB = \_\_\_\_\_

AOC = \_\_\_\_\_

BOC = \_\_\_\_\_

BOD = \_\_\_\_\_

EOA = \_\_\_\_\_

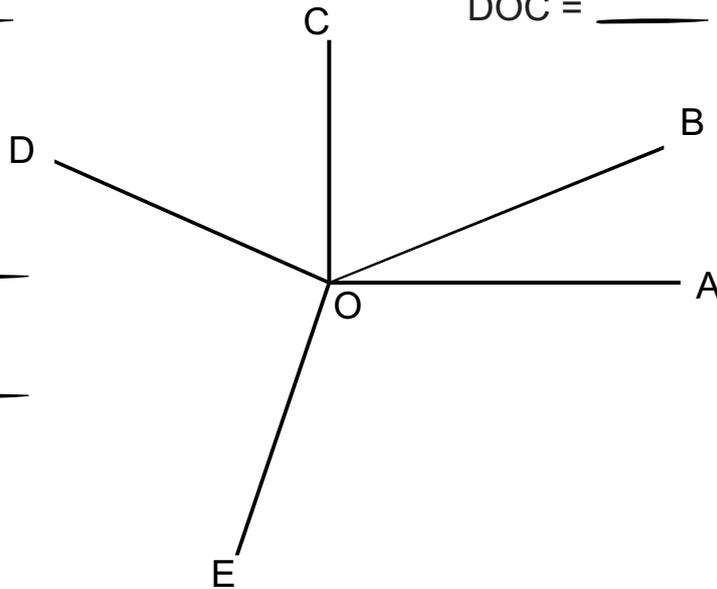
DOA = \_\_\_\_\_

EOC = \_\_\_\_\_

DOC = \_\_\_\_\_

DOE = \_\_\_\_\_

EOB = \_\_\_\_\_



2. The sum of the measurements  $AOB + BOC$  should equal  $AOC$ .  
Check to see if you got this result.

AOB = \_\_\_\_\_

BOC = \_\_\_\_\_

AOB + BOC = \_\_\_\_\_

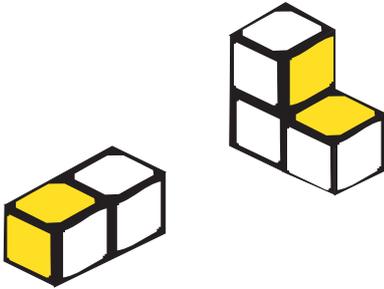
AOC = \_\_\_\_\_

3. A rotation of  $270^\circ$  anticlockwise is the same as a rotation of \_\_\_\_\_ clockwise.

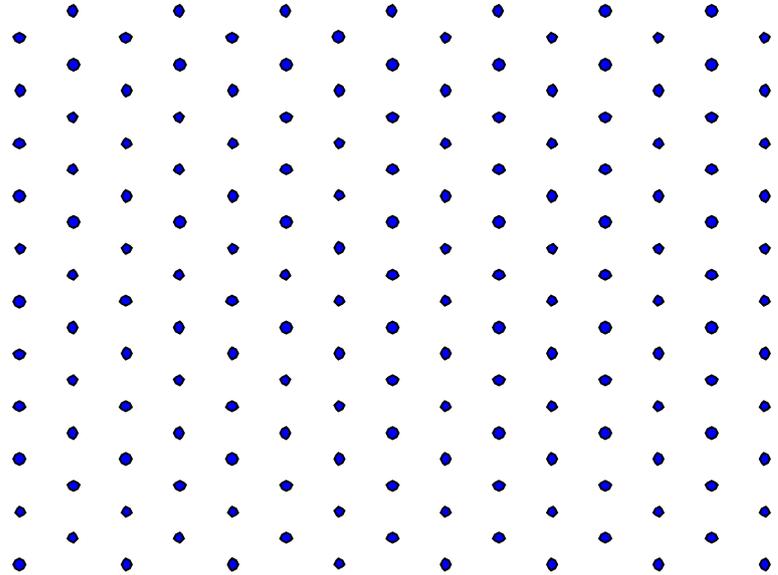
## COMPETITION

You win \$1, 000, 000 but you need to spend the total on at least 10 items in as many different areas as you can. For example you may purchase a house, and car but you will also need furniture, other essential items and food to eat. Collect pictures and prices of what you intend to purchase. These can be from newspapers, magazines or pamphlets. Paste all these items on paper along with a tally of the sums of money involved. Your final total must be exactly \$1,000,000.

# BLUE - Worksheet 25



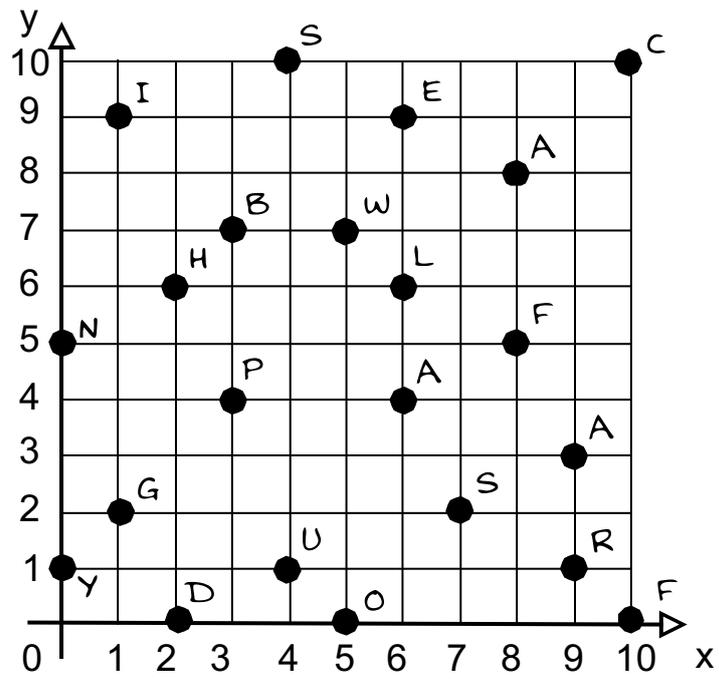
Sketch the result if the two solids are fitted with the shaded faces together.



## MATHEMATICAL EXCURSIONS

How many times does your maths teacher take you on an excursion?

1. How can you make  $10 \text{ plus } 4 = 2$ ? \_\_\_\_\_
2. How many  $\text{m}^3$  of soil are in a hole 1 m deep, 3 m long, and 2 m wide?  
\_\_\_\_\_
3. On a farm in the Hawkes Bay is the world's perfect peach tree. The main trunk has exactly 25 branches, each branch exactly 15 boughs, each bough exactly 5 twigs, and each twig bears 1 fruit.  
How many apples are on the tree?  
\_\_\_\_\_
4. What is the largest number you can write with just 3 digits?  
\_\_\_\_\_
5. How many times can you subtract 2 from the number 21?  
\_\_\_\_\_



Write the correct letter that corresponds to each co-ordinate pair.

What is the best thing to do if your ship starts to sink?

\_\_\_\_\_ (1, 2) \_\_\_\_\_ (9,1) \_\_\_\_\_ (6,4) \_\_\_\_\_ (3,7) \_\_\_\_\_ (8,8) \_\_\_\_\_ (3,4) \_\_\_\_\_ (1,9) \_\_\_\_\_ (6,9) \_\_\_\_\_ (10,10) \_\_\_\_\_ (6,9)

\_\_\_\_\_ (5,0) \_\_\_\_\_ (8,5) \_\_\_\_\_ (7,2) \_\_\_\_\_ (5,0) \_\_\_\_\_ (6,4) \_\_\_\_\_ (3,4) \_\_\_\_\_ (8,8) \_\_\_\_\_ (0,5) \_\_\_\_\_ (2,0)

\_\_\_\_\_ (5,7) \_\_\_\_\_ (9,3) \_\_\_\_\_ (4,10) \_\_\_\_\_ (2,6) \_\_\_\_\_ (0,1) \_\_\_\_\_ (5,0) \_\_\_\_\_ (4,1) \_\_\_\_\_ (9,1) \_\_\_\_\_ (7,2) \_\_\_\_\_ (6,9) \_\_\_\_\_ (6,6) \_\_\_\_\_ (10,0)

\_\_\_\_\_ (9,3) \_\_\_\_\_ (7,2) \_\_\_\_\_ (2,6) \_\_\_\_\_ (5,0) \_\_\_\_\_ (9,1) \_\_\_\_\_ (6,9)

**QUICK QUESTION**

You empty your pockets one day and discover that you have exactly \$38 in coins. No wonder your pants feel heavy! You then discover that you have exactly the same number of 10c, 20c, 50c, \$1 and \$2 coins.

How many of each coin do you have?

---



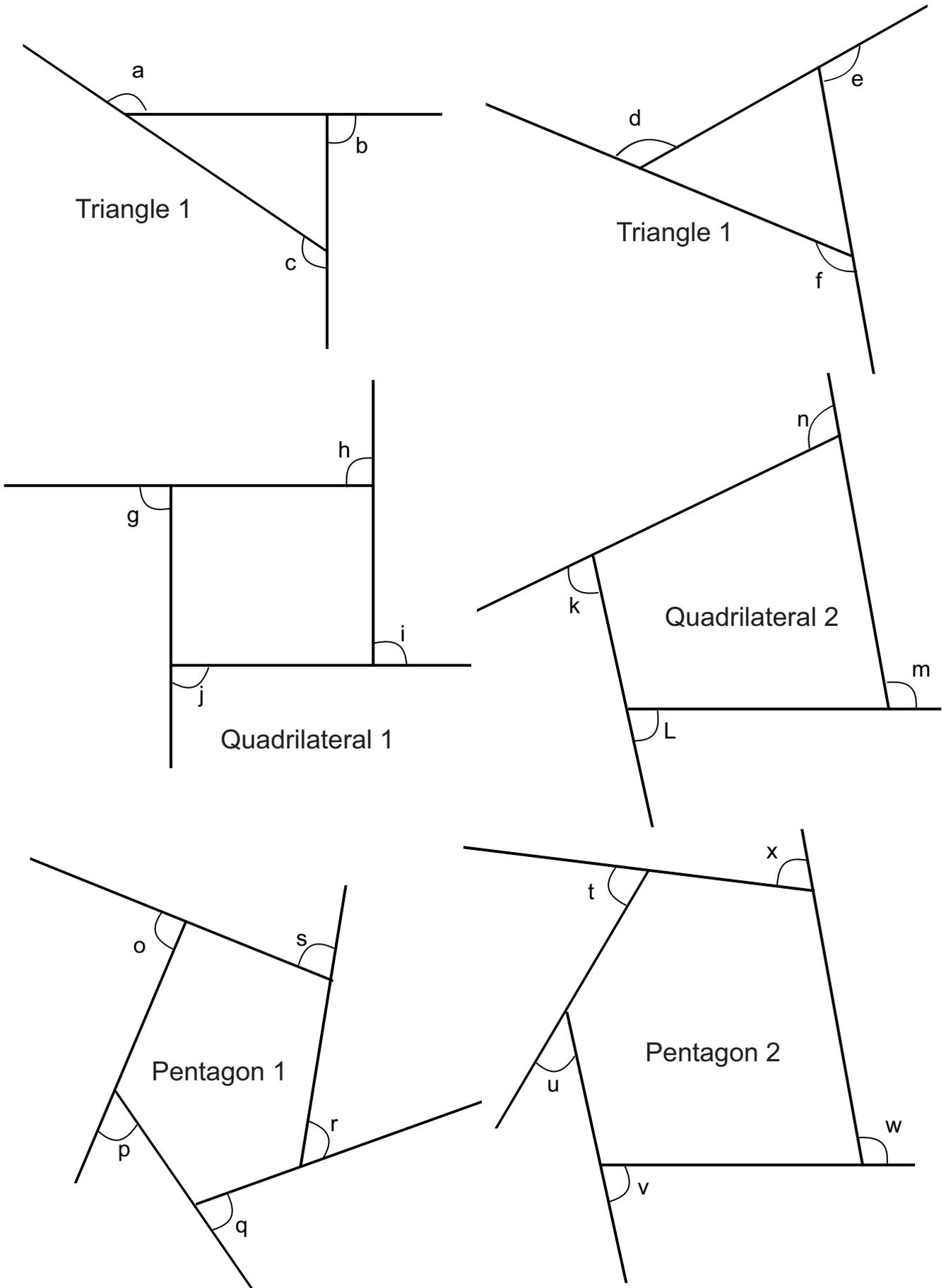
---



---

# ANGLE SUM OF THE EXTERIOR OF A POLYGON

For each of these polygons, measure the exterior angles then record the sums of each in the table on the next page.



| Polygon Name                           | Angle Sizes | Total of all Exterior Angles |
|--|-------------|------------------------------|
| Triangle 1                             |             |                              |
| Triangle 2                             |             |                              |
| Quadrilateral 1                        |             |                              |
| Quadrilateral 2                        |             |                              |
| Pentagon 1                             |             |                              |
| Pentagon 2                             |             |                              |
| Rule for exterior angles of a polygon: |             |                              |

### MATHEMATICAL EXCURSIONS

Because everybody loves going on an excursion.

- How many boxes measuring 1m x 1m x 50cm can be packed into a container measuring 6m x 5m x 4m?

---



---

- A clock loses 10 minutes each hour. If the clock is set correctly at noon, what time is it when it reads 3 PM?

---



---



---



---

- Rachel, Phil and Sue share a sum of money between them. Rachel gets three fifths, Phil gets 0.35 and Sue gets \$900. How much is the original sum of money?

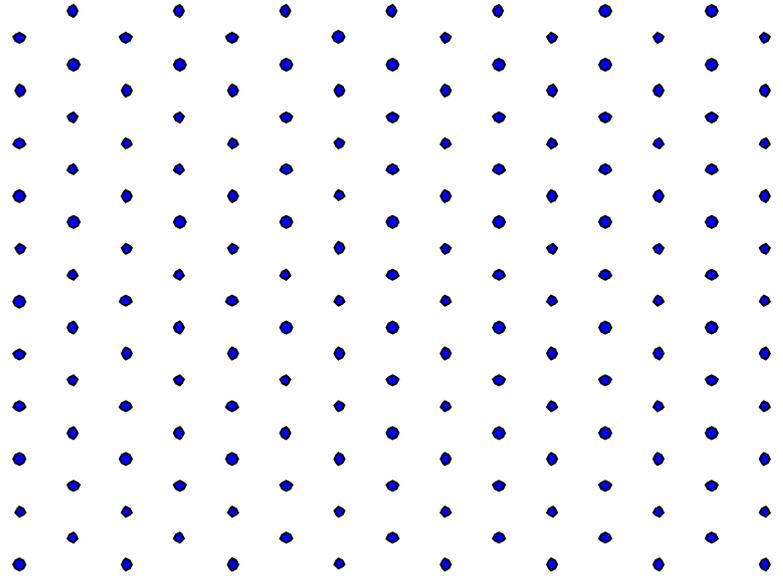
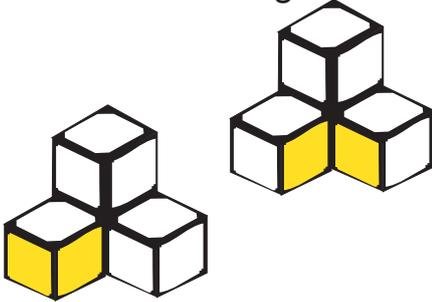
---



---

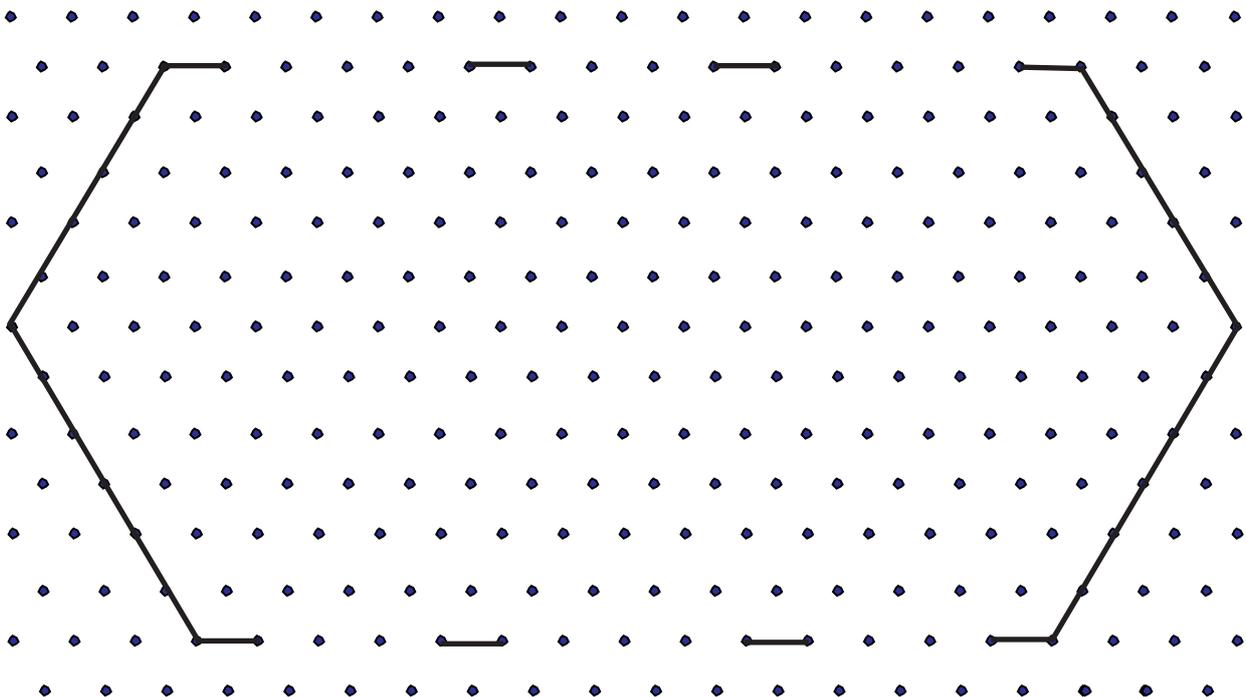
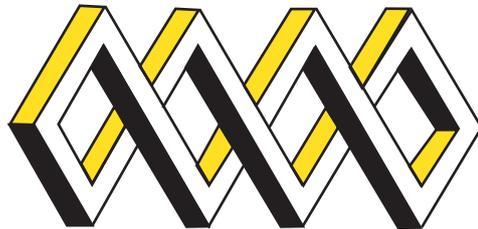
# BLUE - Worksheet 26

Sketch the result if the two solids are fitted with the shaded faces together.



## IMPOSSIBLE SOLID STRUCTURES

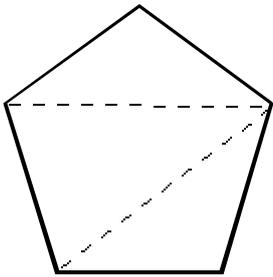
Sketch the following solid on the grid below.



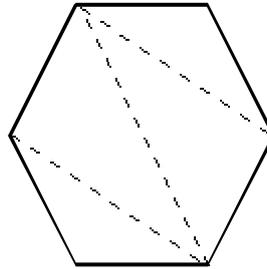
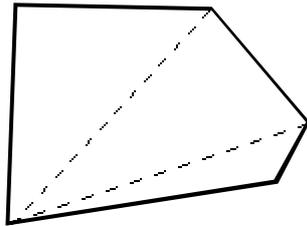
## ANGLE SUM OF THE INTERIOR OF A POLYGON

The angle sum of the interior of a triangle is  $180^\circ$ .

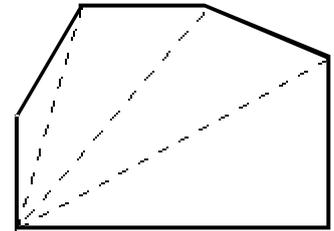
Use this information to complete the table below and discover a formula that gives the interior angle sum inside any polygon.



Pentagons



Hexagons

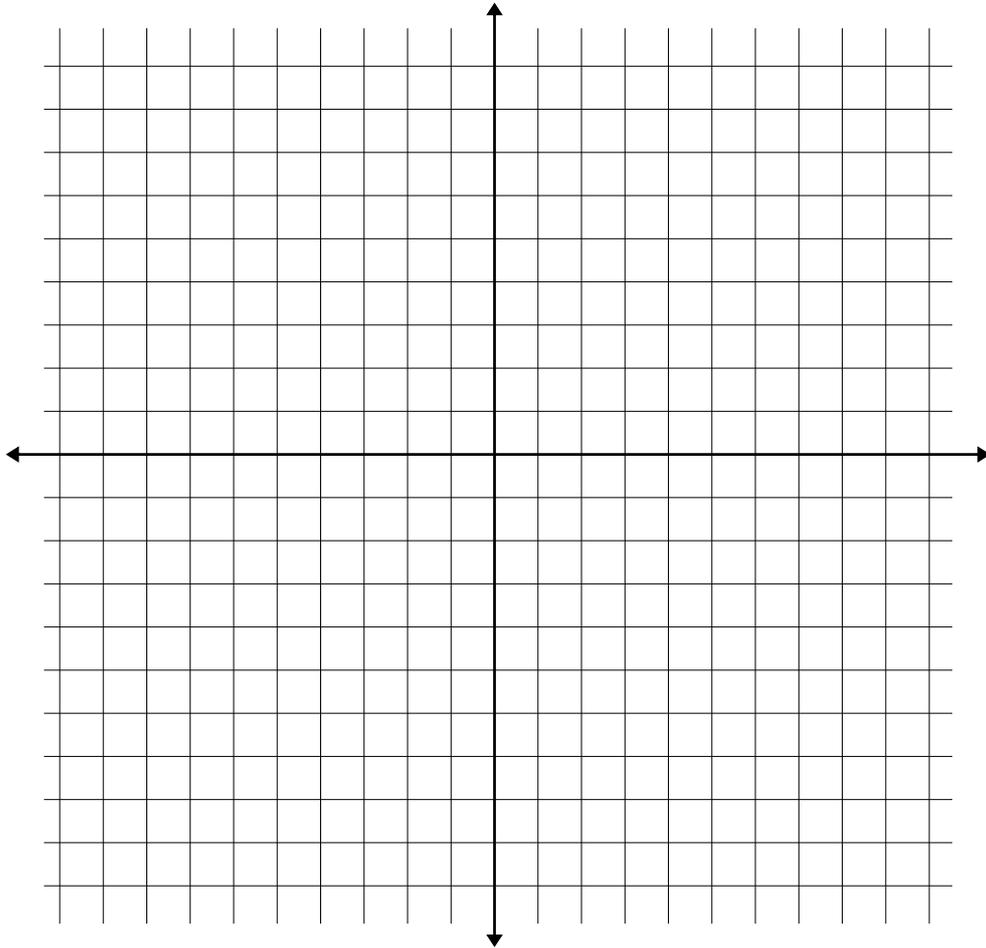


| Polygon Name    | Number of Sides | Number of Triangles | Sum of Interior Angles |
|-----------------|-----------------|---------------------|------------------------|
| Triangle        | 3               |                     |                        |
| Quadrilateral   | 4               |                     |                        |
| <i>Pentagon</i> | 5               |                     |                        |
| <i>Hexagon</i>  | 6               |                     |                        |
| <i>Heptagon</i> | 7               |                     |                        |
| <i>Octagon</i>  | 8               |                     |                        |
| <i>Nonagon.</i> | 9               |                     |                        |
| <i>Decagon</i>  | 10              |                     |                        |

Rule for interior angles of a polygon:

# COORDINATES

1. On the grid below, plot and join each of these co-ordinates in order.  
 (0, -2), (-2, -2), (-2, 0), (0, 0), (0, -2), (2, -2), (2, -3), (4, -1), (2, 1), (2, 0)  
 (0, 0), (0, 2), (1, 2), (-1, 4), (-3, 2), (-2, 2), (-2, 0), (-4, 0), (-4, 1), (-6, -1),  
 (-4, -3), (-4, -2), (-2, -2), (-2, -4), (-3, -4), (-1, -6), (1, -4), (0, -4), (0, -2).

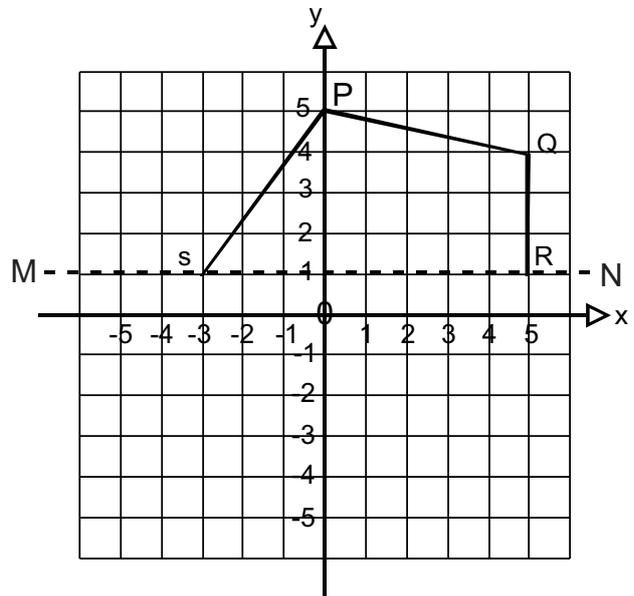


2. Complete the figure below so that MN is a line of symmetry.

3. Write below the co-ordinates of the new points.

\_\_\_\_\_

\_\_\_\_\_



4. What is the name of the shape that has been formed?

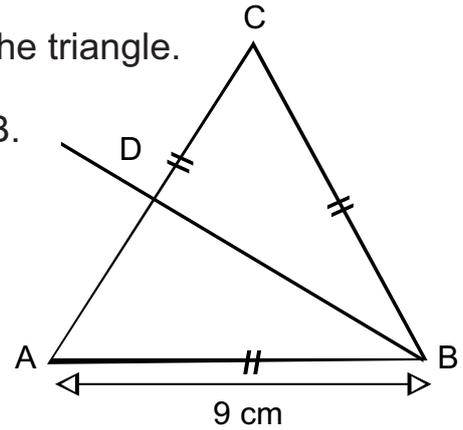
\_\_\_\_\_

# CONSTRUCTIONS

The equilateral triangle ABC shown below has sides lengths of 9 cm.

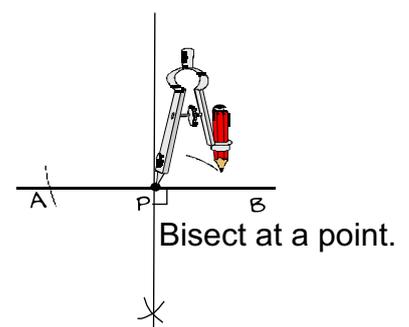
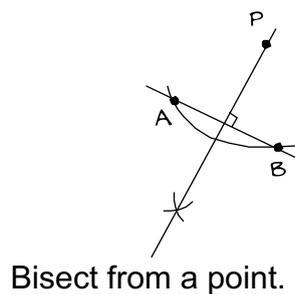
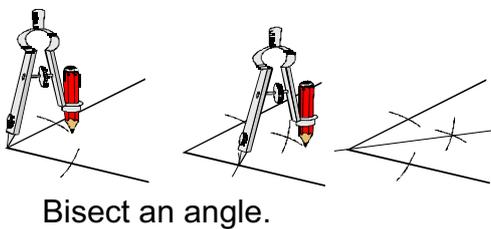
- Using a ruler, pencil and compass construct the triangle.
- Bisect the angle ABC and draw in the line DB.
- Measure the angle ADB.

$\angle ADB =$  \_\_\_\_\_



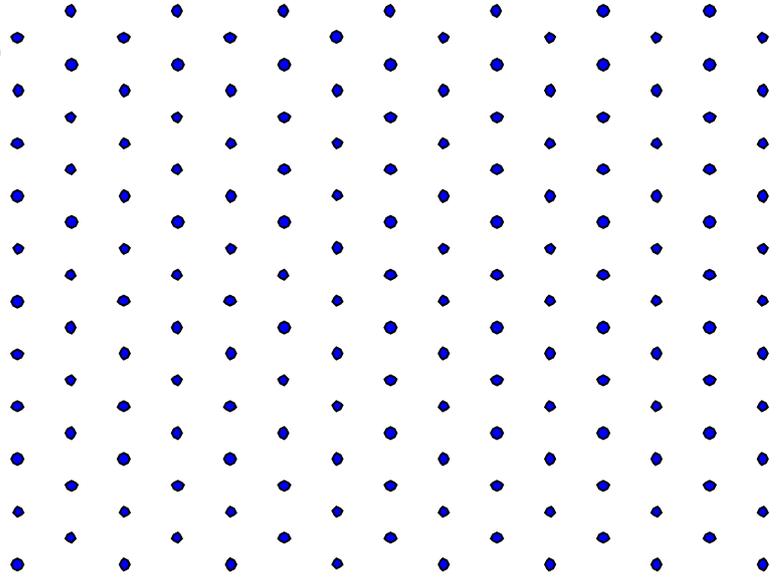
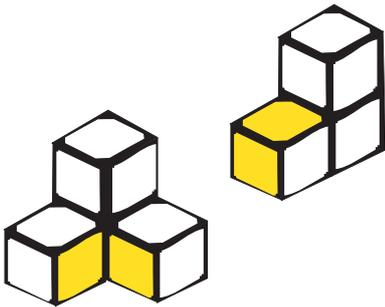
- Bisect means to divide into . . . . . equal parts.

How to bisect using a compass.

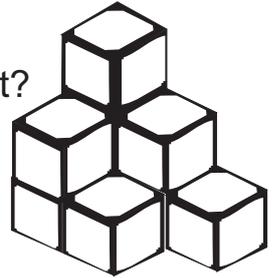


# BLUE - Worksheet 27

1. Sketch the result if the two solids are fitted with the shaded faces together.



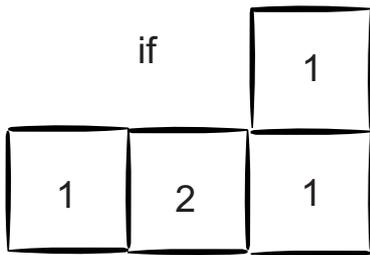
2. How many blocks are needed to build the model on the right?



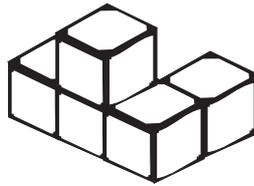
\_\_\_\_\_

- 3.

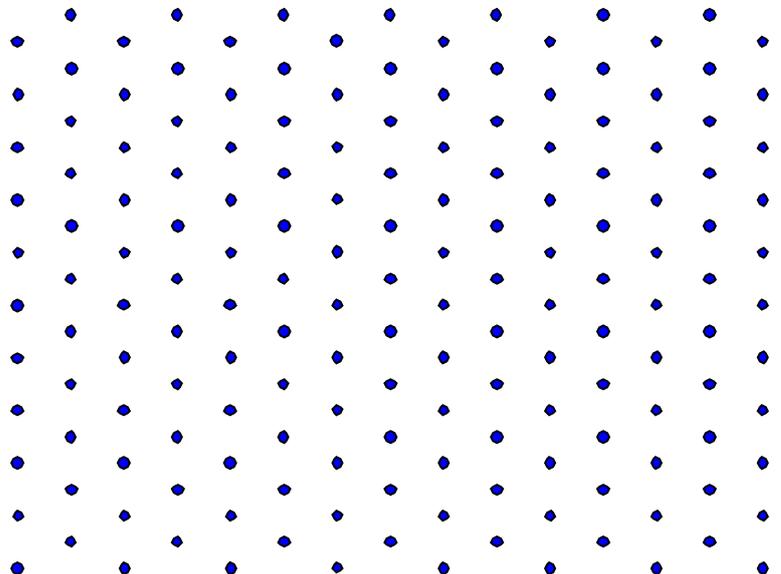
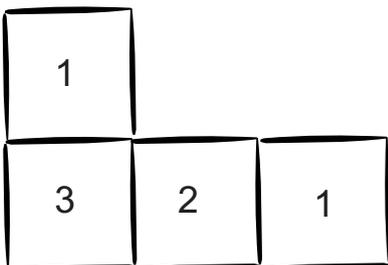
if



represents



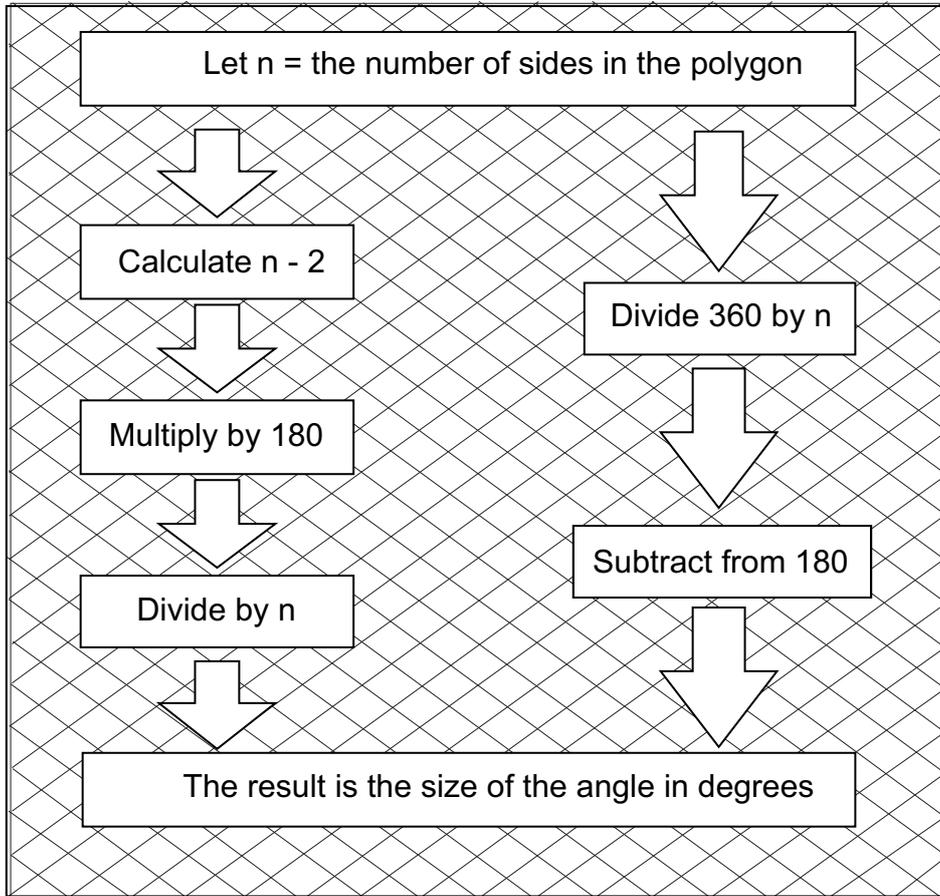
then draw:



# INTERIOR ANGLES OF POLYGONS

Below are two flow charts to find the interior angles of a regular polygon.

1. Use each flow chart to calculate the size of the interior angle of two regular polygons, one with 12 sides and one with 20 sides.



Method 1

Method 2

Interior angle size of a 12 sided polygon: \_\_\_\_\_

Interior angle size of a 20 sided polygon: \_\_\_\_\_

2. In the diagram, three regular polygons fit together exactly at point P. One possible situation is that the polygons could be three regular hexagons. Give another possible combination of polygons that could fit together way (it could be more than 3 polygons).

---



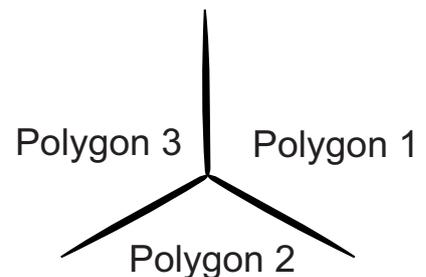
---



---



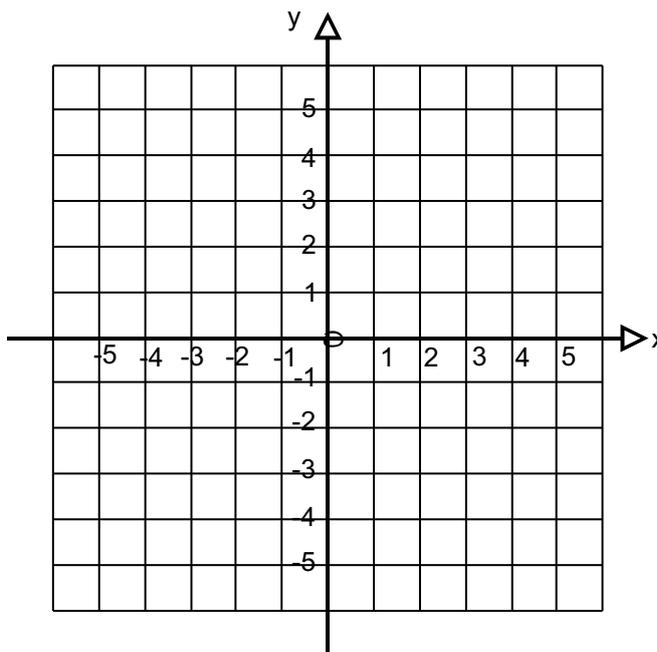
---



## COORDINATES

- On the grid below, plot and join each of these co-ordinates.  
A(-4, 4), B(-3, -3), C(2, -3), D(3, 4), A(-4, 4).
- Write the name of the shape that was formed.

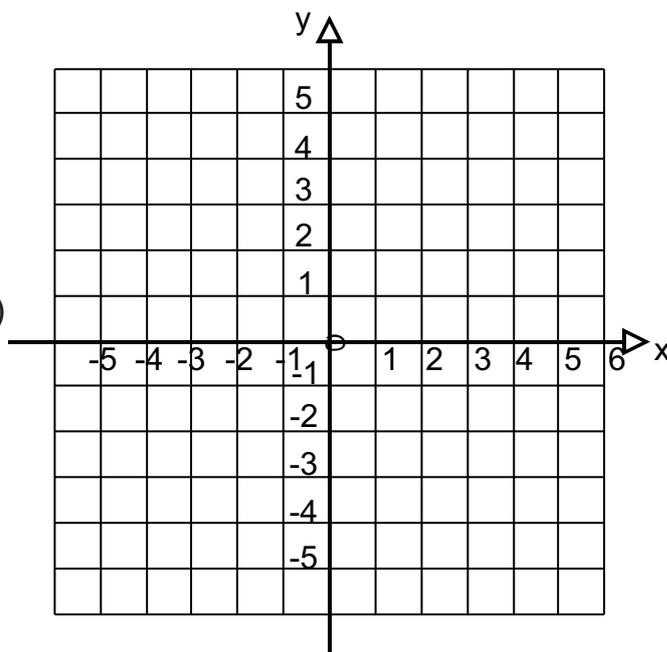
- If each of the co-ordinates were placed at 1 cm intervals, what would the area of the shape be?



Area = \_\_\_\_\_ cm<sup>2</sup>

- On the axes below draw the following six triangles.

- (-5, 3), (-5, 5), (-2, 4), (-5, 3)
- (-4, 1), (-1, 1), (-1, 5), (-4, 1)
- (4, 5), (5, 2), (6, 5), (4, 5)
- (4, 1), (2, -1), (6, -3), (4, 1)
- (2, -2), (3, -5), (1, -5), (2, -2)
- (-1, -5), (-5, -3), (-4, -1), (-1, -5)



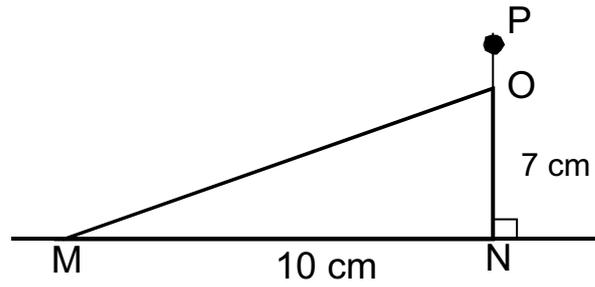
- Name the groups of triangles that are congruent.

\_\_\_\_\_

\_\_\_\_\_

## CONSTRUCTIONS

1. Using the point and the line given, construct the following triangle.



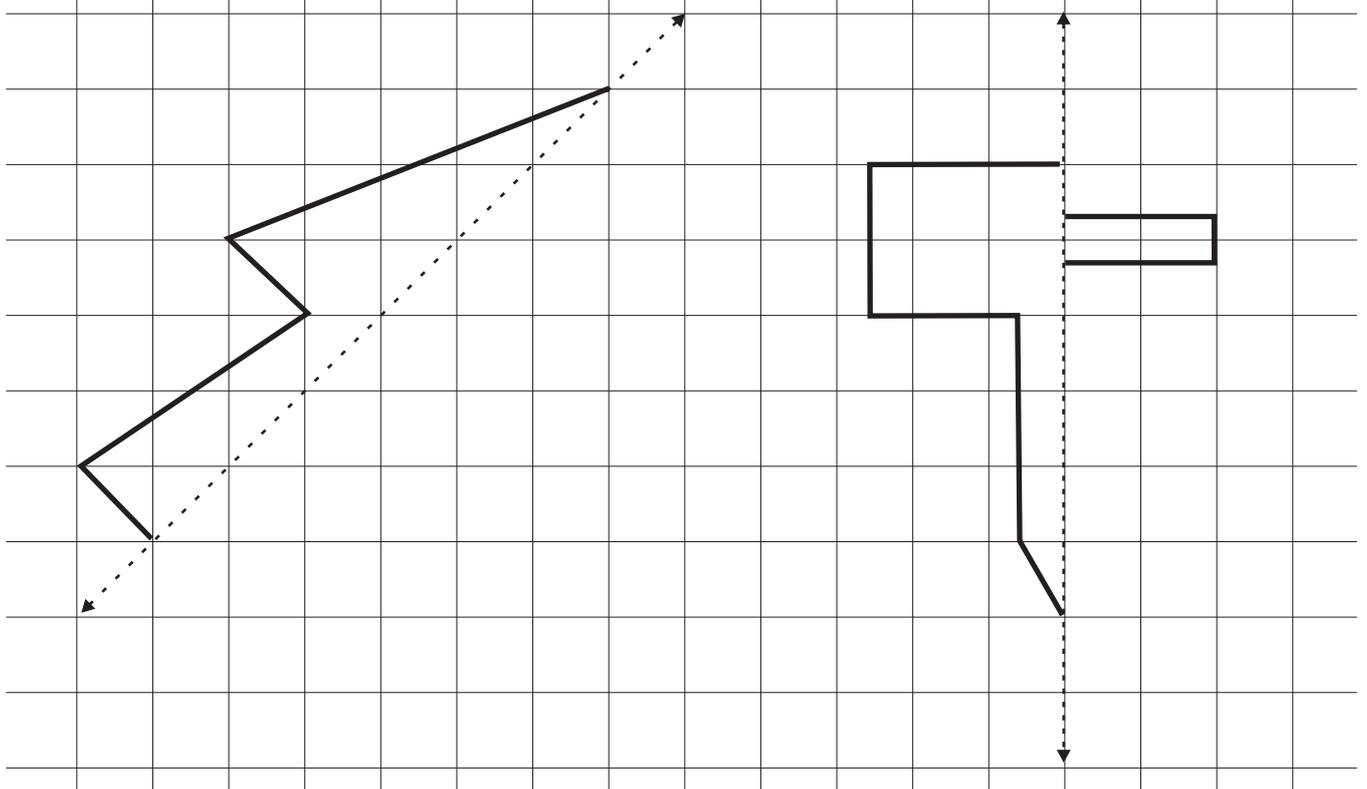
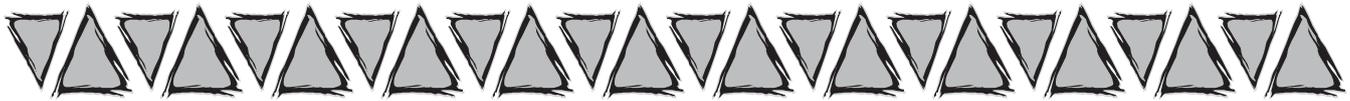
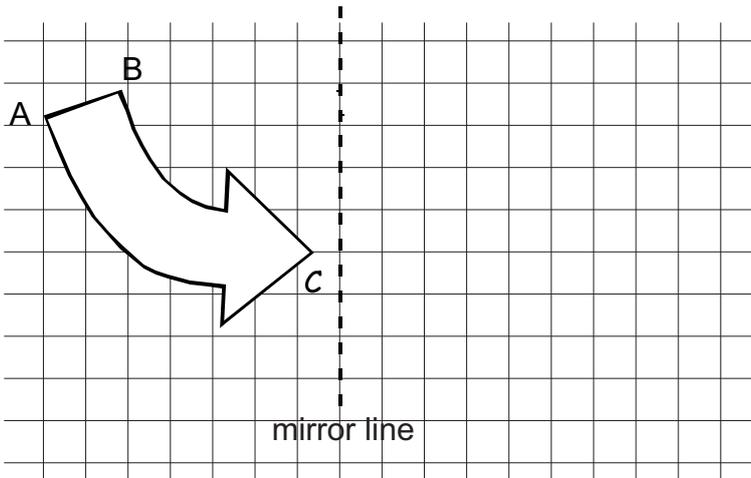
• P

- 
2. On your diagram, measure the angle OMN. = \_\_\_\_\_ °
3. On your diagram measure the length of side MO. = \_\_\_\_\_ cm

# BLUE - Worksheet 28

REFLECTION NOITCJEFER  
REFLECTION NOITCJEFER

Sketch what each figure looks like when reflected.

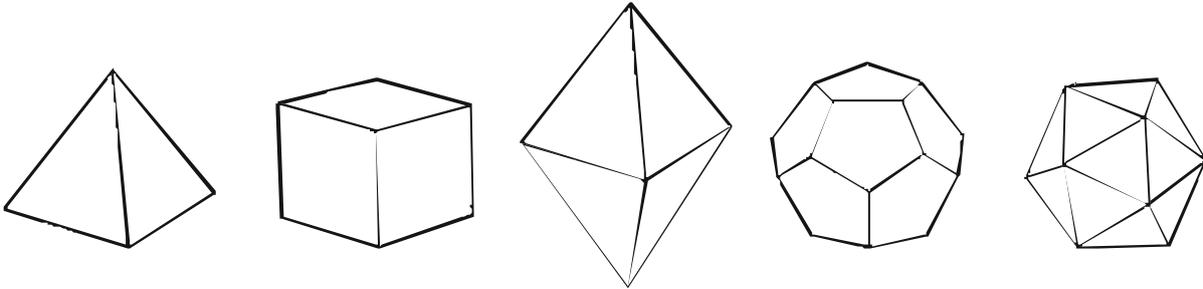


## REGULAR EVERYDAY SOLIDS

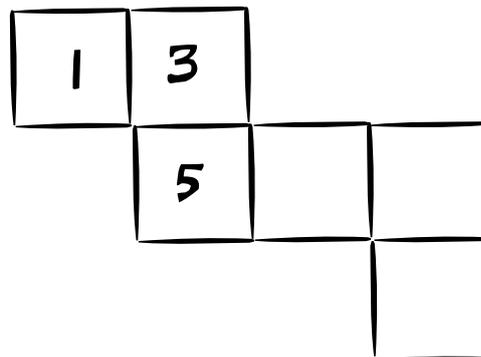
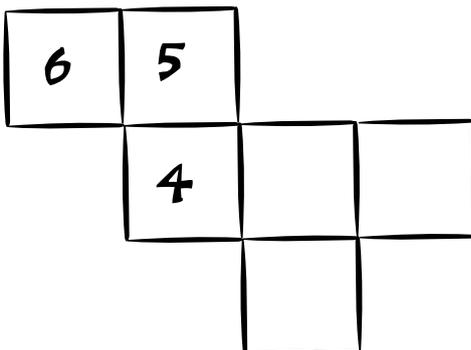
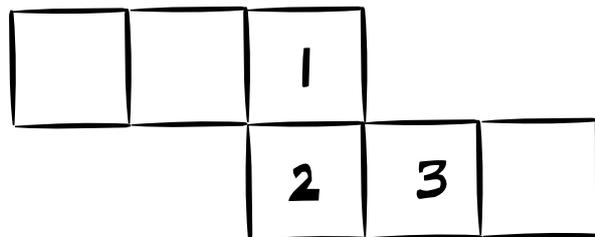
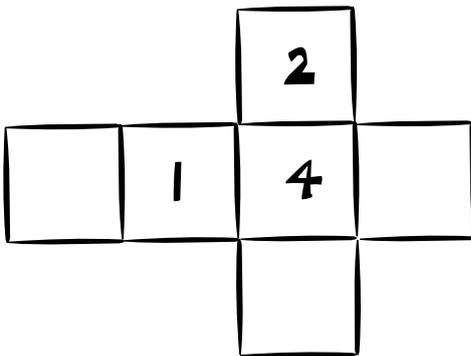
There are only five possible regular solids. They are:

- i. Regular Tetrahedron- four equilateral triangular faces
- ii. Cube - six square faces
- iii. Regular Octahedron - eight equilateral triangular faces
- iv. Regular Dodecahedron - twelve pentagonal faces
- v. Regular Icosahedron - twenty equilateral triangular faces

1. Using the list and descriptions above, write the name of each of the solids.

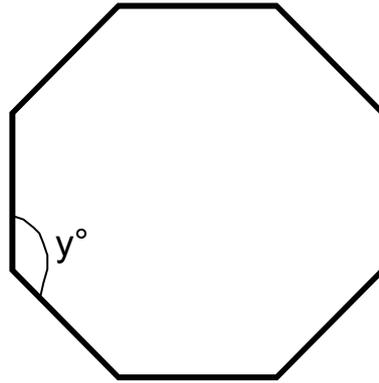
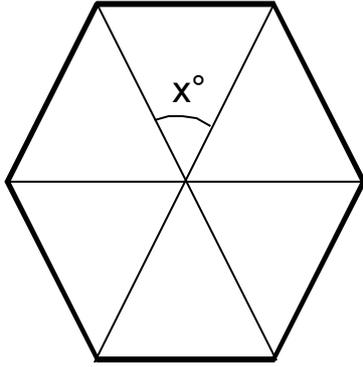


2. For dice to be “fair” the numbers on opposite sides of the cubes must sum to 7. Below are a series of 4 nets that could be folded to form a die. Some of the faces have already been labeled. On each of the other faces, write the numbers so that the opposite face, when folded to be a cube, will add to 7.



## POLYGON ANGLES

The diagram below shows a regular hexagon and a regular octagon.



1. What is the size of the angle marked  $x^\circ$ ? \_\_\_\_\_

2. What is the size of the angle marked  $y^\circ$ ? \_\_\_\_\_

\_\_\_\_\_



## MATHEMATICAL EXCURSIONS

1. What number divided by 4 is the same as that number minus 4?

\_\_\_\_\_

2. Using eight eights and addition only, make a sum that equals 1000.

\_\_\_\_\_

3. Arrange four 7's with any mathematical symbols to make the total 100.

\_\_\_\_\_

4. Use four 9's in a mathematical equation that equals 100.

\_\_\_\_\_

5. Use only 7, 8, 9 and any mathematical symbols to make total 50 and 100.

\_\_\_\_\_

\_\_\_\_\_

6. What is the next number? 1 8 27 64 125

\_\_\_\_\_

7. If  $x - 5 = 50$  then  $x + 7 = \dots\dots\dots ?$

\_\_\_\_\_

## ANGLES

Look at the shapes then answer the questions.

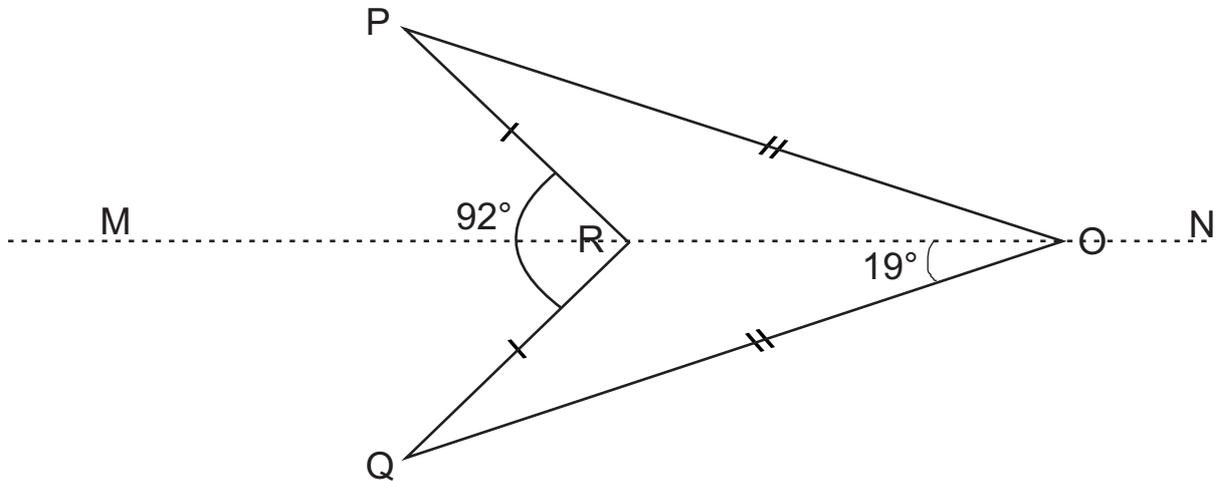
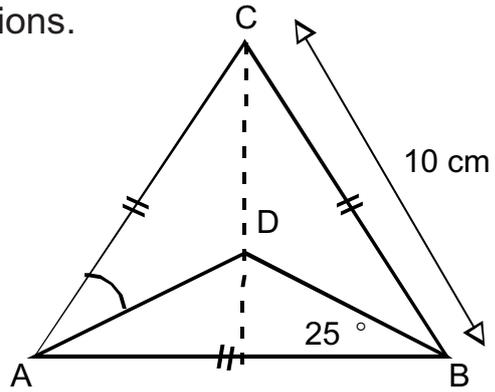
1. Angle ACB = \_\_\_\_\_

2. Angle CAD = \_\_\_\_\_

3. Angle ADB = \_\_\_\_\_

4. What sort of triangle is ABC? \_\_\_\_\_

5. What sort of triangle is ABD? \_\_\_\_\_



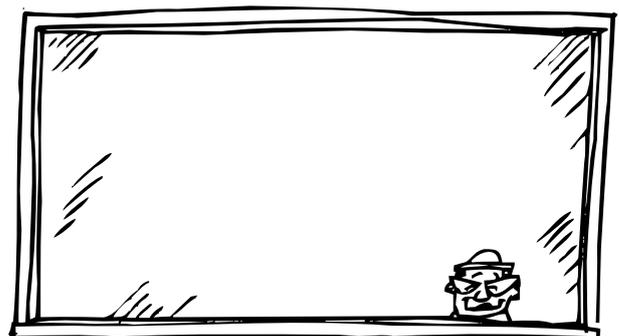
6. Angle MRQ = \_\_\_\_\_

7. Angle POQ = \_\_\_\_\_

8. Angle OQR = \_\_\_\_\_

## REFLECTION

Draw what the window looks like from the other side.

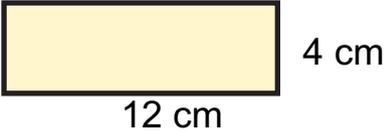


# BLUE - Worksheet 29

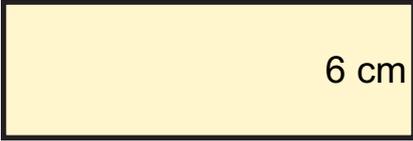
If a figure is enlarged by scale factor  $k$ , then the area of the figure is enlarged by the factor  $k^2$ . To demonstrate this, complete the areas of the rectangles below.

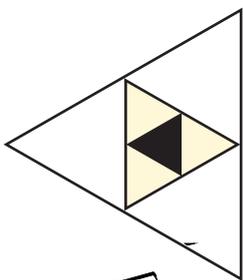
1.  Scale Factor = 1  
Area = \_\_\_\_\_



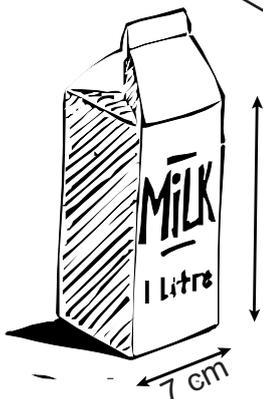
2.  Scale Factor = 2  
Area = \_\_\_\_\_  
i.e.  $2^2 \times 12\text{cm}^2 =$  \_\_\_\_\_



3.  Scale Factor = 3,  
Area = \_\_\_\_\_  
i.e.  $3^2 \times 12\text{cm}^2 =$  \_\_\_\_\_



4. This diagram is made up of equilateral triangles. The smallest (black) triangle has an area of  $10\text{m}^2$ . What is the area of the largest triangle?  
\_\_\_\_\_

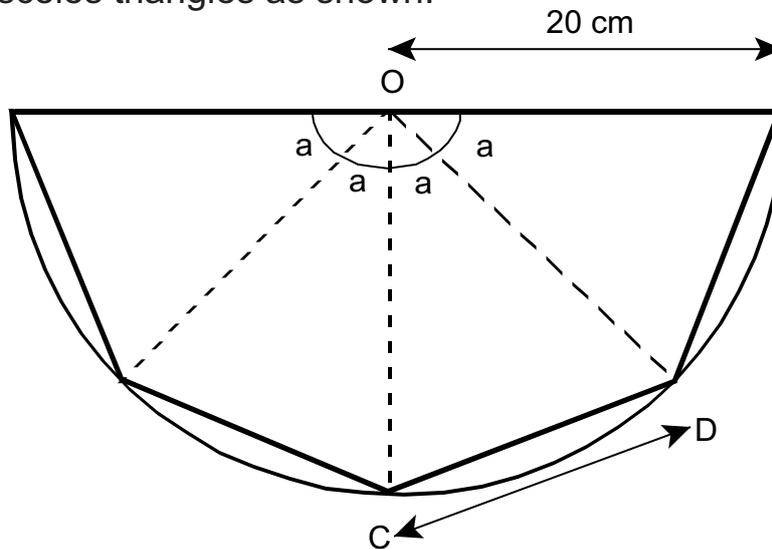


5. The milk carton shown holds 1 litre of milk. What is the height of the carton if it has a  $7\text{cm} \times 7\text{cm}$  square base?  
Height = \_\_\_\_\_
6. What will the height of the carton be if the base is the same dimensions but the carton holds 300 ml?  
\_\_\_\_\_

## PYRAMIDS

Below are the steps to make a pyramid with a square base. Complete each of the steps and answer the questions.

- On a piece of cardboard, draw a semicircle, centre O, radius 10 cm and make 4 isosceles triangles as shown.



- Calculate the measurements of the following:

The lengths OD and OC.

\_\_\_\_\_

The length CD.

\_\_\_\_\_

The angles labeled a.

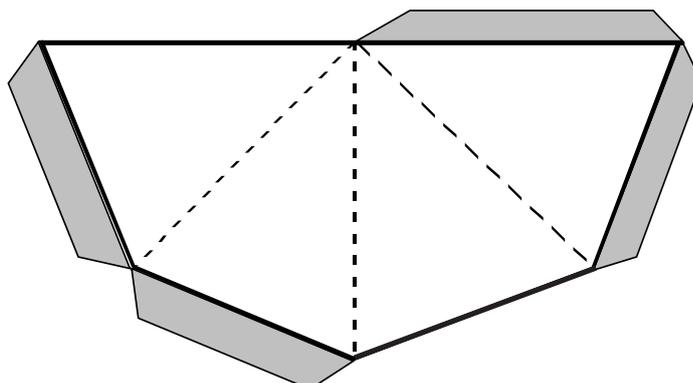
\_\_\_\_\_

- What is the name of the triangle formed by OCD?

\_\_\_\_\_

- To complete the pyramid, you will have to add a base.  
What will be the shape and what will be the measurements of the base?

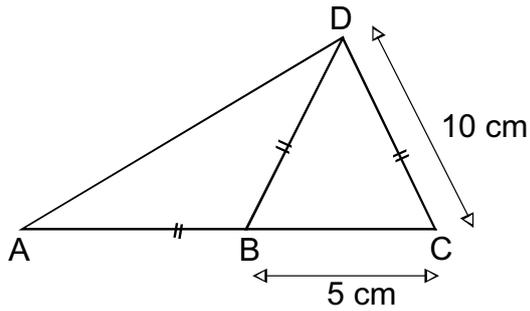
\_\_\_\_\_



- Add the base and tabs, score all the lines and fold to make a pyramid.

## MORE MEASUREMENT

In the space below, construct the triangle diagram shown.




---

Use a protractor on your diagram to measure the size of all angles, then use your measurements to show that the following statements are true.

1. "Angles in a triangle sum to  $180^\circ$ ."

$$\angle CAD + \angle ADC + \angle DCA = 180^\circ$$

---

$$\angle BAD + \angle ADB + \angle DBA = 180^\circ$$

---

$$\angle CBD + \angle BDC + \angle DCB = 180^\circ$$

---

2. "Angles on a straight line sum to  $180^\circ$ ."

$$\angle DBA + \angle DBC = 180^\circ$$

---

3. "An isosceles triangle has two equal angles."

$$\angle DBC = \angle DCB$$

---

$$\angle BDA = \angle BAD$$

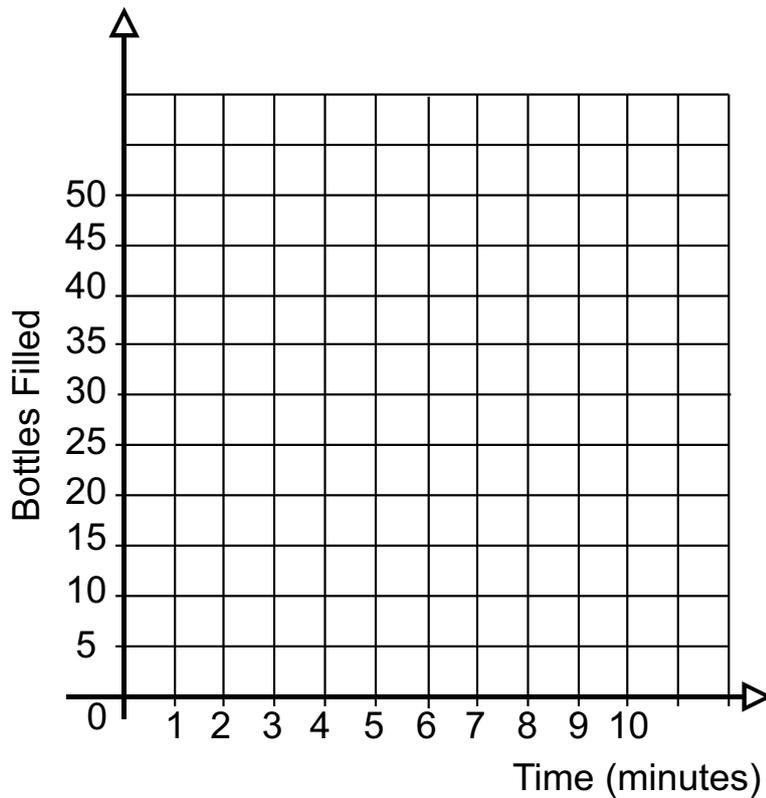
---

## GRAPHS

At the Mahobe Orange Juice Factory, bottles of fresh orange juice are produced for despatch to supermarkets. The bottling machine is able to fill and seal five, 2 litre bottles of juice every minute.

- Complete the table below, then use the co-ordinates to construct a line graph of the production.

| Time | Bottles Filled | Co-ordinates |
|------|----------------|--------------|
| 0    | 0              | (0, 0)       |
| 1    | 5              | (1, 5)       |
| 2    | _____          | _____        |
| 3    | _____          | _____        |
| 4    | _____          | _____        |
| 5    | _____          | _____        |



- How long does it take to fill 50 bottles?

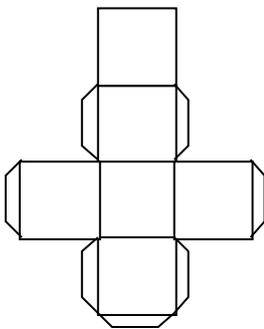
---

# BLUE - Worksheet 30

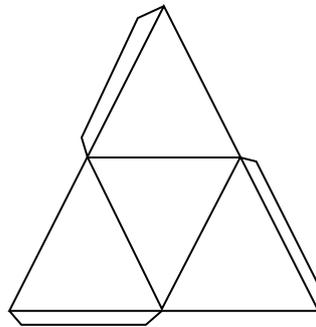
## NETS AND SOLIDS

In mathematics, a net is a pattern of polygons that can be cut out and folded up to make a solid object. Below are some common nets.

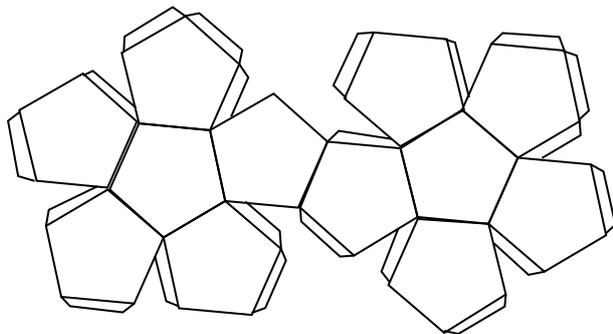
1. Choose at least one of the nets. Note whether it is made up of squares, equilateral triangles or pentagons. Use this information to draw it onto a larger piece of card and fold to make the shape.



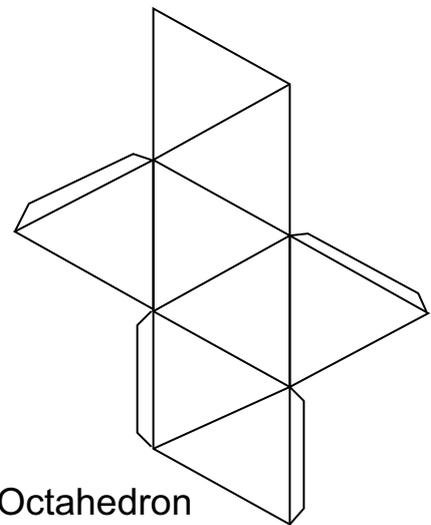
Cube



Tetrahedron

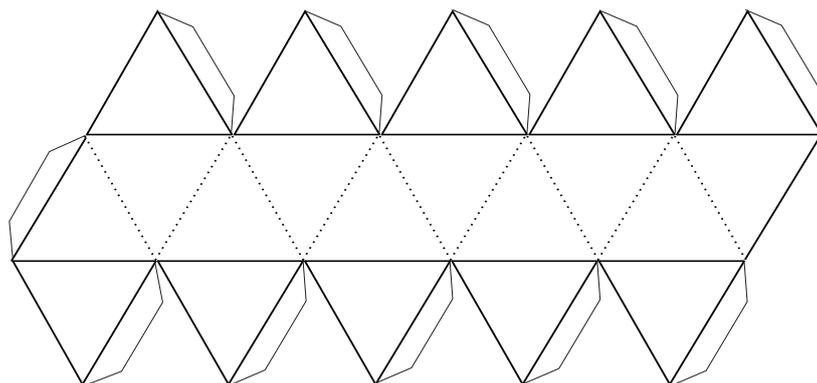


Dodecahedron



Octahedron

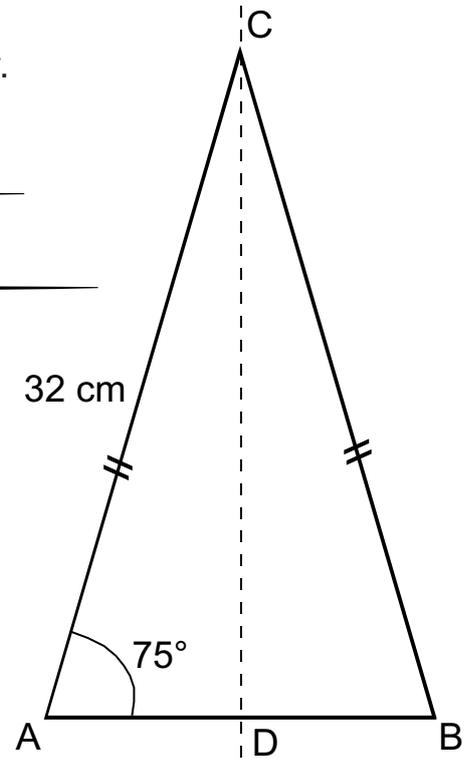
Icosahedron



## TRIANGLES AND ANGLES

Answer the questions that refer to the triangle below.

1. ABC is called an \_\_\_\_\_
2. The dashed line CD is called \_\_\_\_\_
3. The length of BC is \_\_\_\_\_
4. Angle B = \_\_\_\_\_
5. Angle C = \_\_\_\_\_
6. Angles in a triangle sum to \_\_\_\_\_

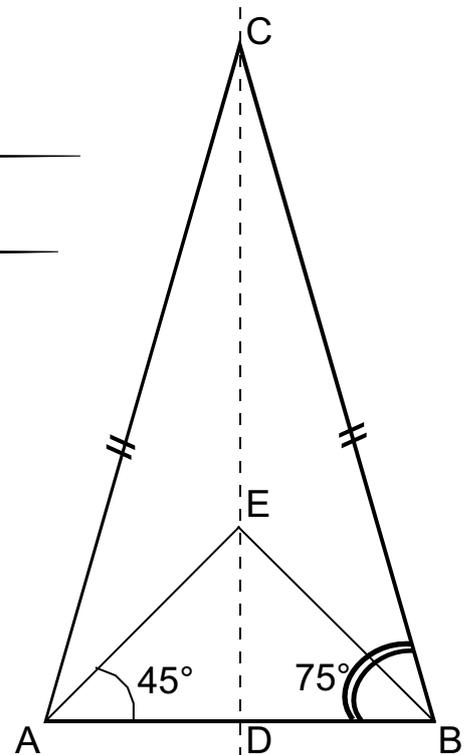


The triangle above has had another triangle drawn inside it (see below). Use this information to answer the next set of questions.

7.  $\angle AEB$  is called an \_\_\_\_\_
8. The triangle  $\angle DCB$  is called a \_\_\_\_\_
9.  $\angle CAE$  and  $\angle CBE =$  \_\_\_\_\_
10.  $\angle CEB$  and  $\angle CEA =$  \_\_\_\_\_

Reason: \_\_\_\_\_

\_\_\_\_\_



## REMEMBER ENLARGEMENTS

The large triangle shown below is enlarged to form the small triangle.

1. Give the scale factor of the enlargement.

\_\_\_\_\_

\_\_\_\_\_

4 cm



8 cm

## GRAPH APPLICATIONS

The perimeter of a square is the sum of the lengths of all the sides.

The diagram below gives the perimeter of three figures made from 1 cm squares.

1 square  
Perimeter = 4cm



2 squares  
Perimeter = 6cm

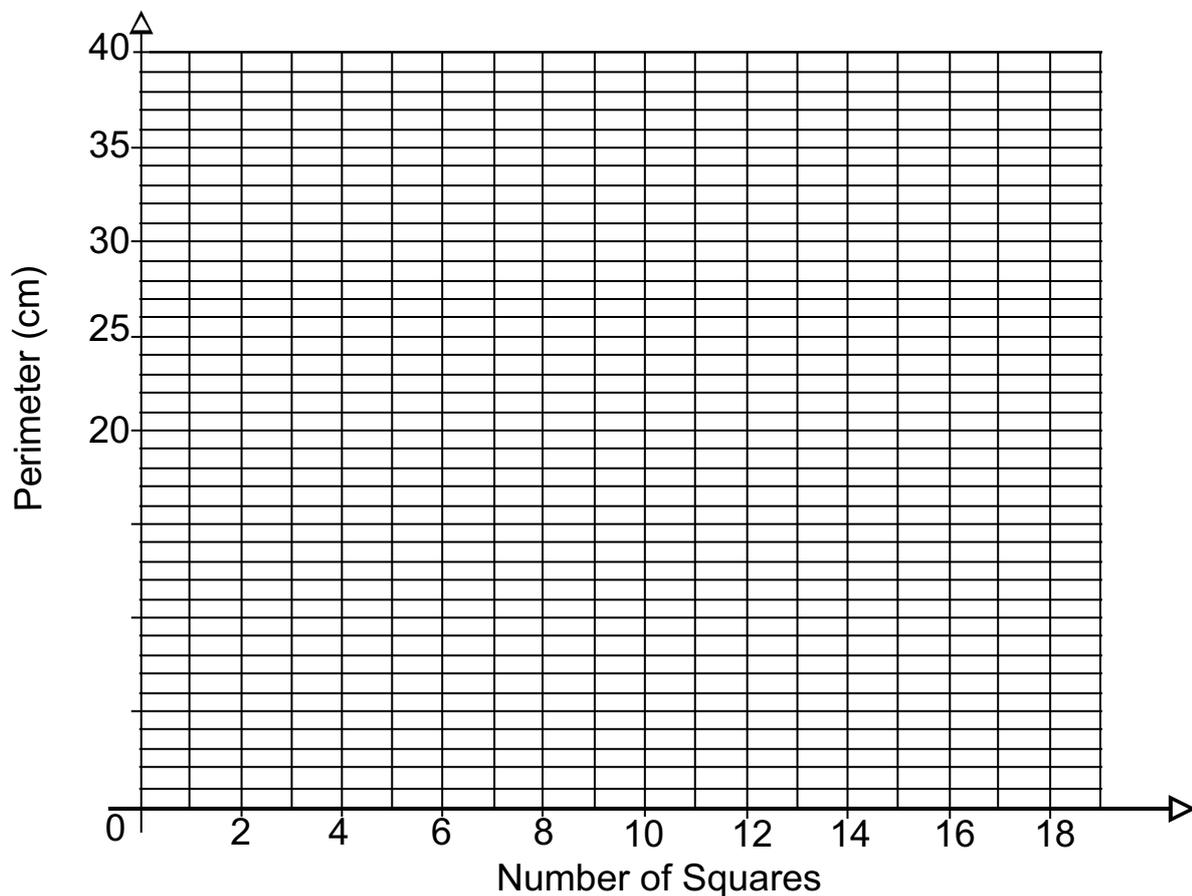


3 squares  
Perimeter = 8cm



|                        |   |   |   |    |    |    |    |    |
|------------------------|---|---|---|----|----|----|----|----|
| Centimeter Squares (x) | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  |
| Perimeter (y) cm       | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |

- Using the results of the table, plot the co-ordinates on the graph below, where the x axis co-ordinate is the number of centimeter squares, and the y axis co-ordinate is the resultant perimeter.



- What is the perimeter of the rectangle formed by 18 centimeter squares?

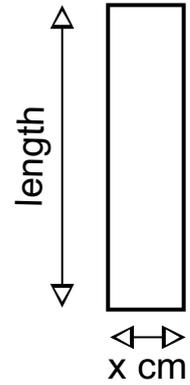
---

- How many squares form a rectangle with perimeter of 26 cm?

---

## GRAPH APPLICATIONS

The rectangle shown on the right has a width of  $x$  centimeters.  
The length of the rectangle is 4 cm more than the width.



1. Write an expression for the length of the rectangle.

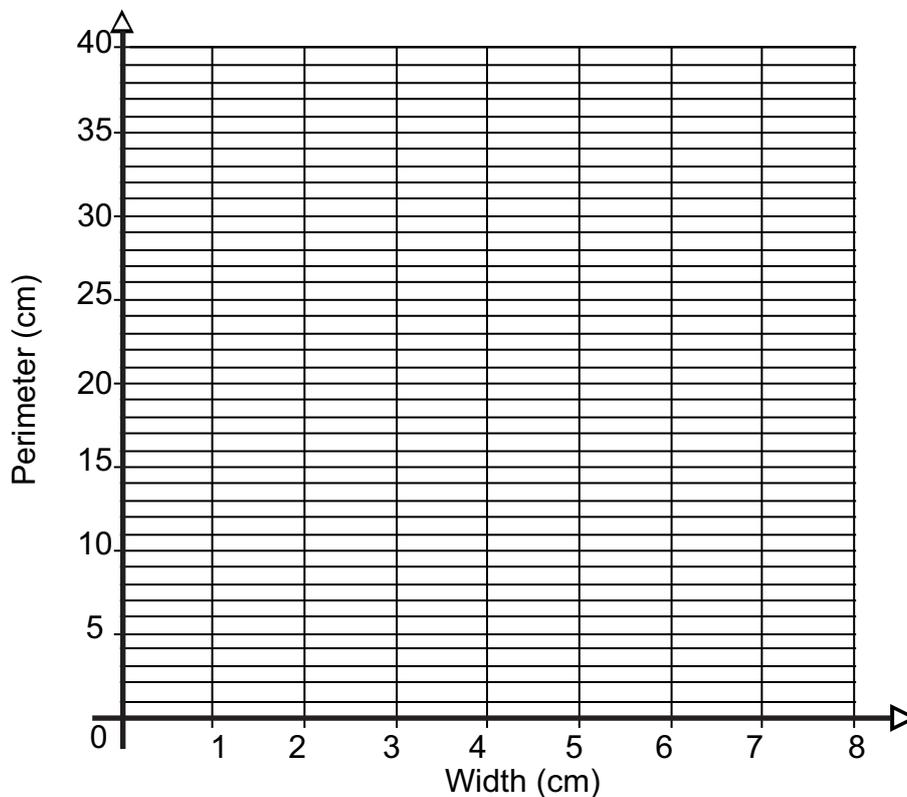
---

2. Use your expression from 1. to write a formula for the perimeter,  $P$ , of the rectangle.

---

3. The table below gives different values for  $x$ , the rectangle's width, as well as corresponding values for the length and perimeter. Complete the table then plot the points on the graph.

|           |    |    |   |   |   |    |    |    |
|-----------|----|----|---|---|---|----|----|----|
| Width     | 1  | 2  | 3 | 4 | 5 | 6  | 7  | 8  |
| Length    | 5  | 6  | 7 | 8 | 9 | 10 | 11 | 12 |
| Perimeter | 12 | 16 |   |   |   |    |    |    |



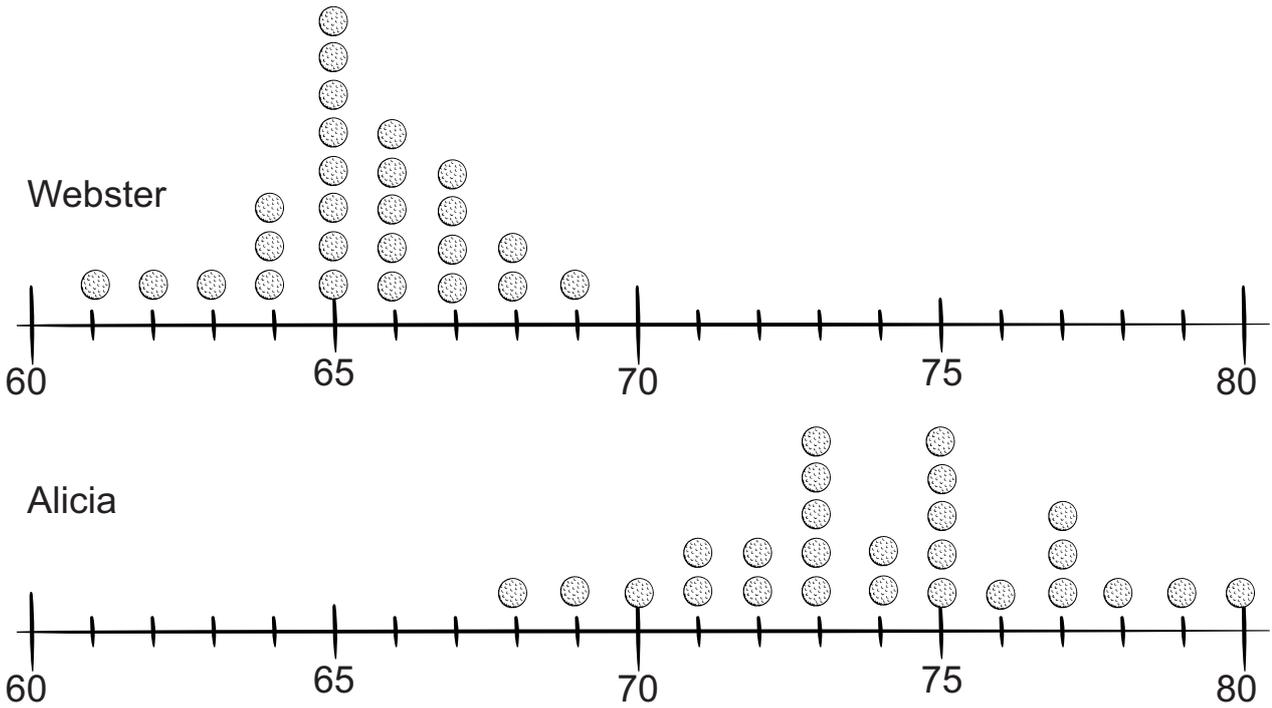
4. What will be the width of the rectangle if the perimeter is 38 cm?

---

# BLUE - Worksheet 31

## GOLFING STATISTICS

Every Sunday morning Webster and Alicia visit the Ngunguru Golf Course in Northland to play a round of golf. Ngunguru has a par of 62 for men and 64 for women. The last 26 weeks of scores are graphed below.



1. Calculate the following statistics:

|        | Webster | Alicia |
|--------|---------|--------|
| Mean   |         |        |
| Median | _____   | _____  |
| Mode   | _____   | _____  |
| Range  | _____   | _____  |

3. What are the graphs above called? (Circle the correct answer.)

- Box and Whisker Graph
- Bar Graph
- Pictogram
- Stem and Leaf
- Line Plot

2. Write a statement that compares both golfers.

---



---

We asked Webster for his cooperation in a data gathering exercise. We got him to hit 30 balls in succession with his driver club. We then measured how far each ball travelled. The data (measured in metres) is as follows:

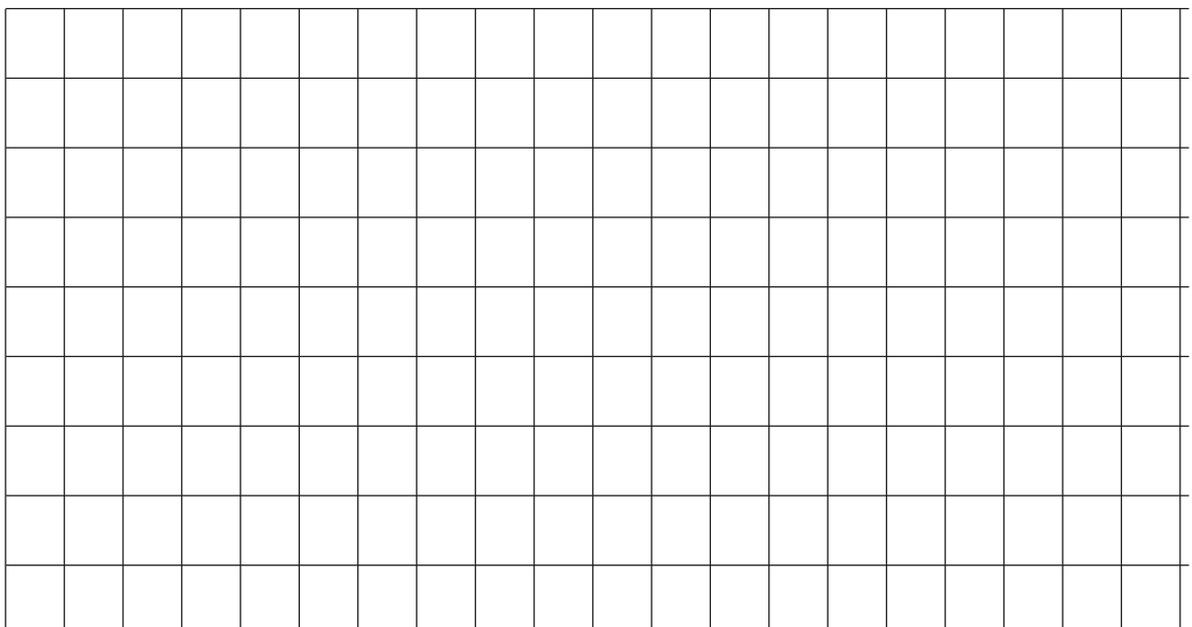
|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 244.8 | 245.2 | 247.0 | 248.9 | 250.0 |
| 252.2 | 251.5 | 252.7 | 254.5 | 254.6 |
| 257.9 | 258.0 | 262.8 | 261.5 | 261.8 |
| 261.1 | 262.2 | 264.2 | 263.8 | 265.0 |
| 265.8 | 265.9 | 267.7 | 268.3 | 268.9 |
| 270.8 | 274.1 | 271.9 | 276.1 | 278.4 |

3. Complete the frequency table for the results.

| Distance | Tally | Frequency |
|----------|-------|-----------|
| 240 -    |       |           |
| 245 -    |       |           |
| 250 -    |       |           |
| 255 -    |       |           |
| 260 -    |       |           |
| 265 -    |       |           |
| 270 -    |       |           |
| 275 -    |       |           |

4. Complete this statement: "The group '240 - ' includes data values equal to or greater than \_\_\_\_\_ but \_\_\_\_\_"

5. Draw a histogram of the results.



## STATISTICAL TABLES

Insurance Companies use statistics collected on life expectancy and death rates in order to work out the premium to charge people who insure with them for life insurance.

The table on the right shows the current age of a person, the number expected to survive and the remaining life expectancy.

| Life Insurance Table |                  |                           |        |                  |                           |
|----------------------|------------------|---------------------------|--------|------------------|---------------------------|
| MALE                 |                  |                           | FEMALE |                  |                           |
| Age                  | Number Surviving | Remaining Life Expectancy | Age    | Number Surviving | Remaining Life Expectancy |
| 0                    | 100 000          | 73                        | 0      | 100 000          | 79                        |
| 5                    | 98 809           | 69                        | 5      | 99 307           | 75                        |
| 10                   | 98 698           | 64                        | 10     | 99 125           | 70                        |
| 15                   | 98 555           | 59                        | 15     | 98 956           | 65                        |
| 20                   | 98 052           | 54                        | 20     | 98 758           | 60                        |
| 25                   | 97 325           | 50                        | 25     | 98 516           | 56                        |
| 30                   | 96 688           | 45                        | 30     | 98 278           | 51                        |
| 35                   | 96 080           | 40                        | 35     | 98 002           | 46                        |
| 40                   | 95 366           | 36                        | 40     | 97 615           | 41                        |
| 45                   | 94 323           | 31                        | 45     | 96 997           | 36                        |
| 50                   | 92 709           | 26                        | 50     | 95 945           | 32                        |
| 55                   | 89 891           | 22                        | 55     | 94 285           | 27                        |
| 60                   | 85 198           | 18                        | 60     | 91 774           | 23                        |
| 65                   | 78 123           | 15                        | 65     | 87 923           | 19                        |
| 70                   | 67 798           | 12                        | 70     | 81 924           | 15                        |
| 75                   | 53 942           | 9                         | 75     | 72 656           | 11                        |
| 80                   | 37 532           | 7                         | 80     | 58 966           | 8                         |
| 85                   | 20 998           | 5                         | 85     | 40 842           | 6                         |
| 90                   | 8416             | 4                         | 90     | 21 404           | 4                         |
| 95                   | 2098             | 3                         | 95     | 7004             | 3                         |
| 100                  | 482              | 2                         | 100    | 1953             | 2                         |

1. Calculate the probabilities that a male and a female will live to 100 years old.

---

2. Can you use the table to estimate how many years you expect to live?

---



---



---

3. Calculate the estimated probability that a female baby born today will live to the age of 20.

---

4. Calvin is 15 years old and there are 16 males in his class. If his school has a class reunion in 30 years, how many of his classmates would you expect to be alive and able to attend the reunion?

---



---

5. Insurance companies sell policies to people to insure them against death. If the person dies during this period the beneficiaries will receive an agreed payout sum of money. Why are life insurance policies cheaper when taken out as a 20 year old rather than a 50 year old?

---

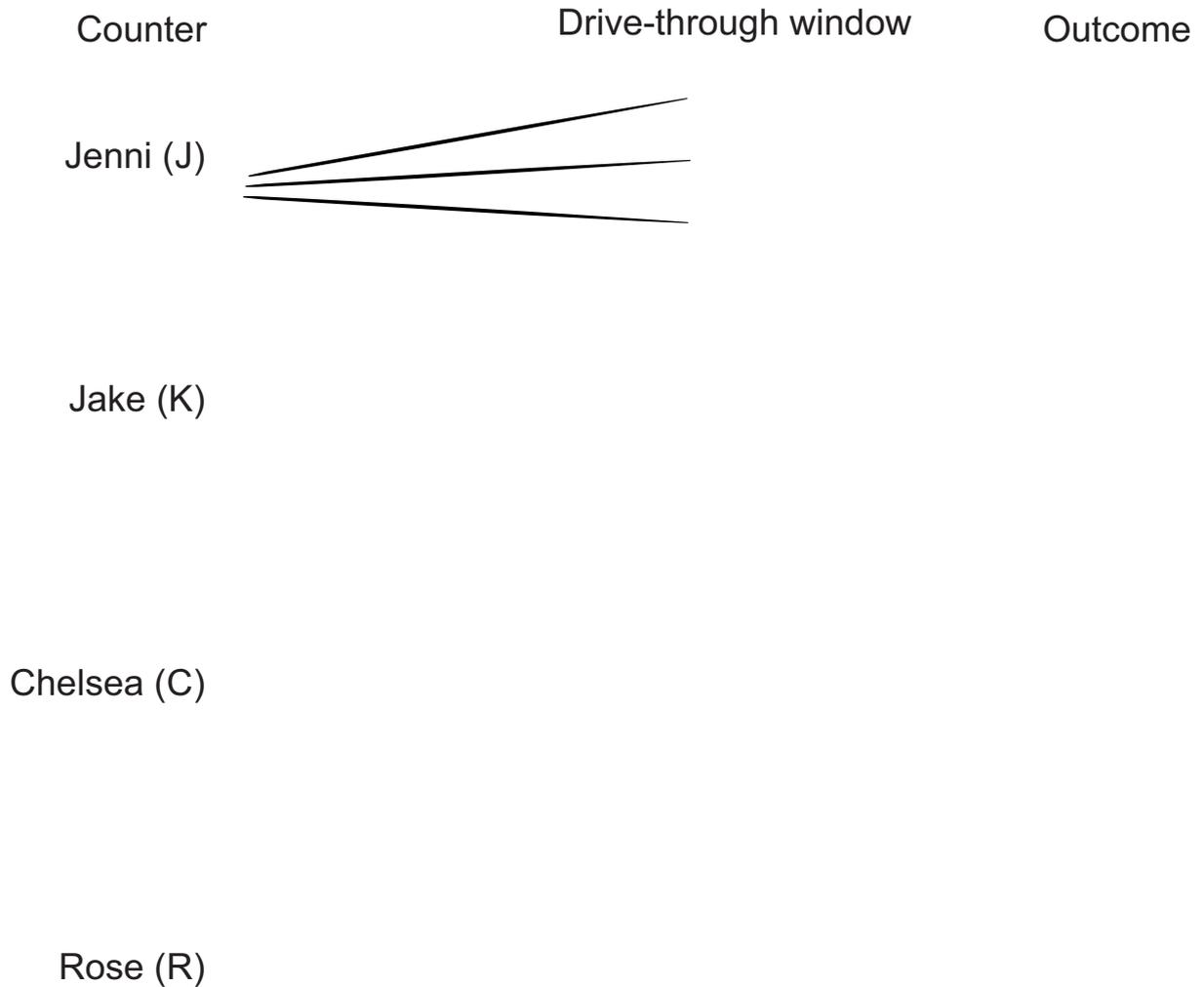


---

## TREE DIAGRAMS

The manager of Fast Fry Chicken needs to hire two employees, one to work at the front counter and one to work at the drive-through window. Jenni, Jake, Chelsea and Rose all apply for a job.

1. How many possible ways are there for the manager to place the applicants? Finish the tree diagram below to show the possible arrangements.



2. Jenni tells her parents that altogether 4 people have applied for the jobs and therefore each person has a 25% chance of being chosen. Is this a reasonable statement?

---

---

---

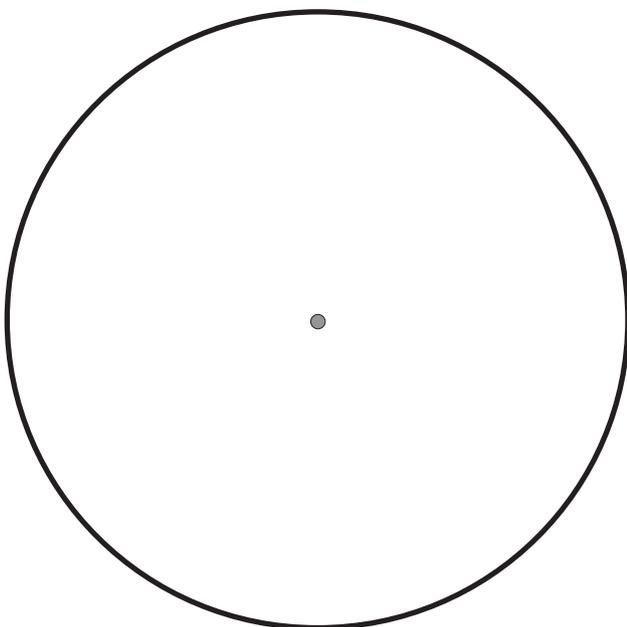
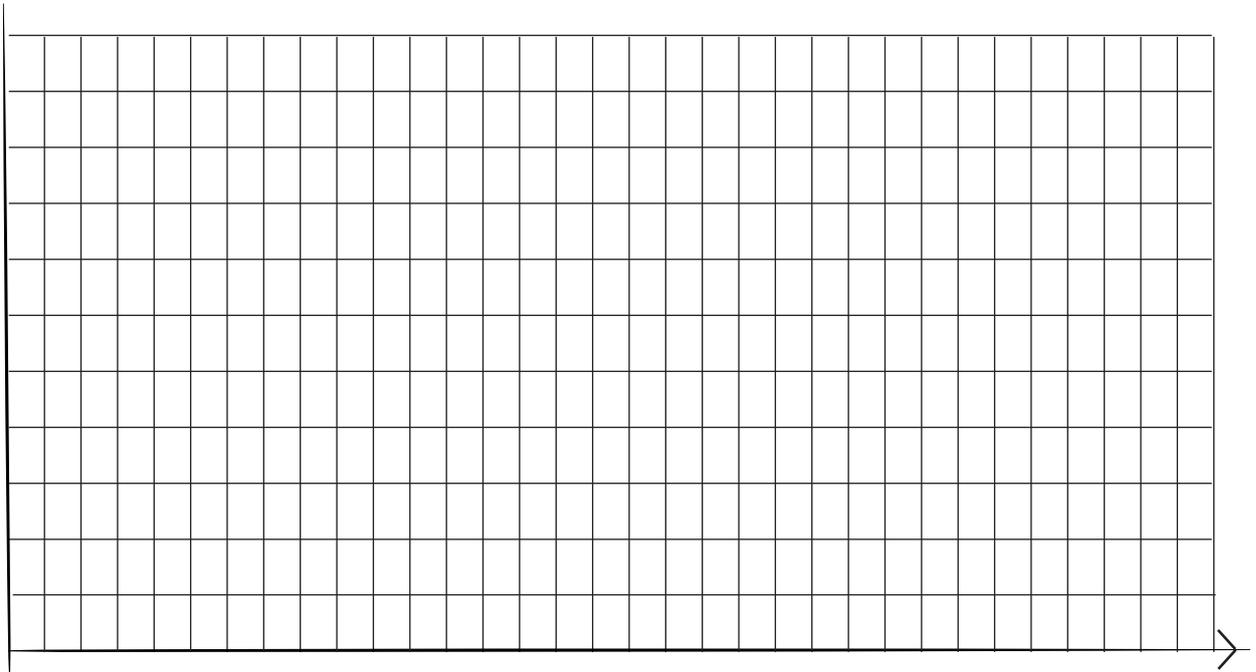
---

# BLUE - Worksheet 32

## STATISTICAL GRAPHS

What is your favourite colour? One survey has produced the following responses to that question: Blue 45%, Green 15%, Red 15%, Black 10%, Purple 5%, Orange 4%, Yellow 2%, White 2%, Brown 1%, and Gray 1%.

1. Draw a Bar Graph and a Pie Graph of the results. What are the major features of the graphs and which is the best graph to show these major features?



---

---

---

---

---

---

---

---

---

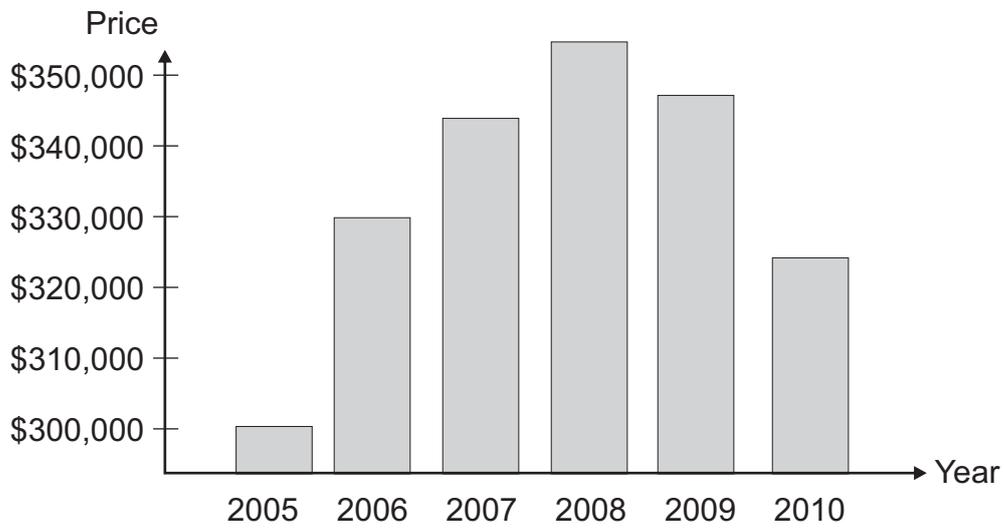
---



# MISLEADING GRAPHS

Some graphs misinform. Look at the following graphs and say how they are misleading. How should they be drawn?

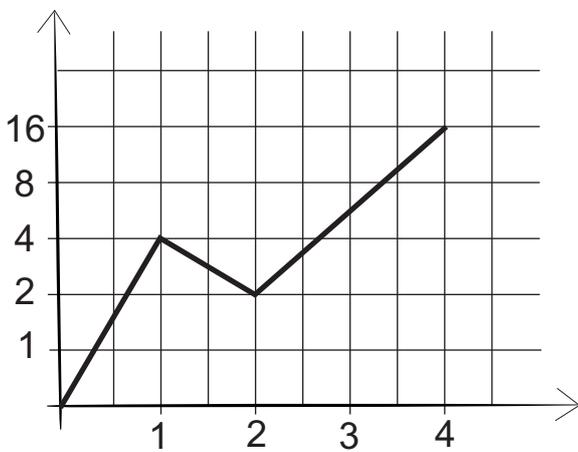
### Auckland Average House Price



---

---

---



---

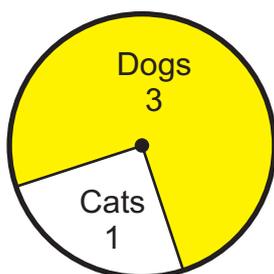
---

---

---

---

### Survey of Preferred Pets



---

---

---

---

---

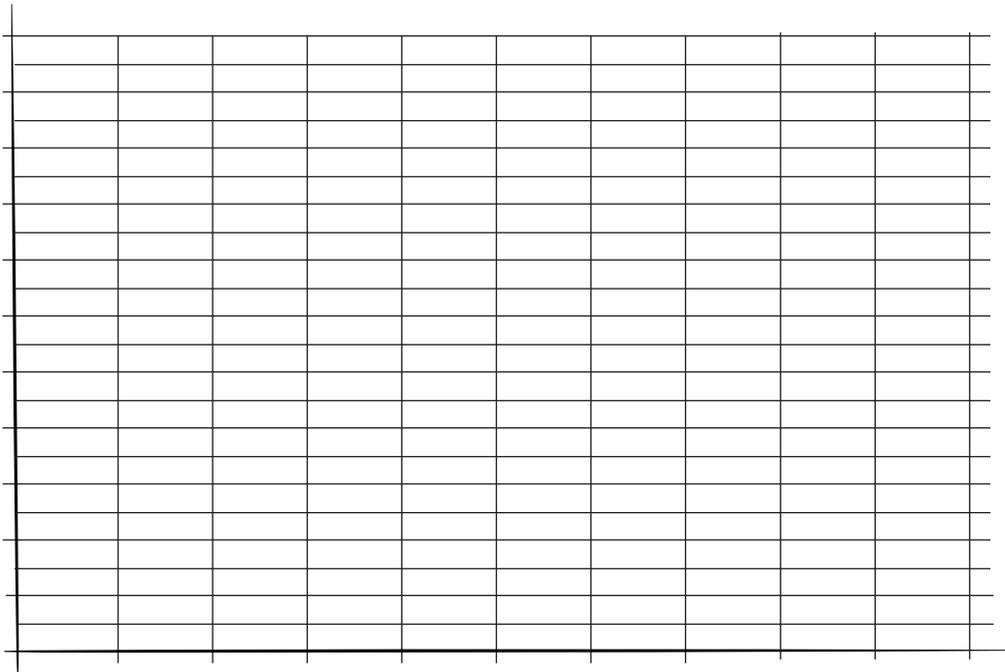
## PLOTTING POINTS ON A GRAPH

Kate and Maria have started a fitness regime. Every morning they meet at 6 am and jog / walk around the block.

Below are the times taken.

|                |    |    |    |    |   |   |   |   |
|----------------|----|----|----|----|---|---|---|---|
| Day            | 1  | 2  | 3  | 4  | 5 | 6 | 7 | 8 |
| Time (minutes) | 65 | 63 | 61 | 59 |   |   |   |   |

1. Draw a graph on the grid below and plot the data.



2. Extend your graph using the same pattern of times to Day 8.
3. Describe what is happening to the times.  
Estimate the times taken on Days 5 to 10.

---

---

---

4. Kate has started a diary of weight loss due to her fitness regime. Find an equation or rule that relates to the week number and the mass of Kate.

|             |    |    |    |    |   |   |   |   |
|-------------|----|----|----|----|---|---|---|---|
| End of Week | 1  | 2  | 3  | 4  | 5 | 6 | 7 | 8 |
| Mass (kg)   | 52 | 51 | 50 | 49 |   |   |   |   |

---

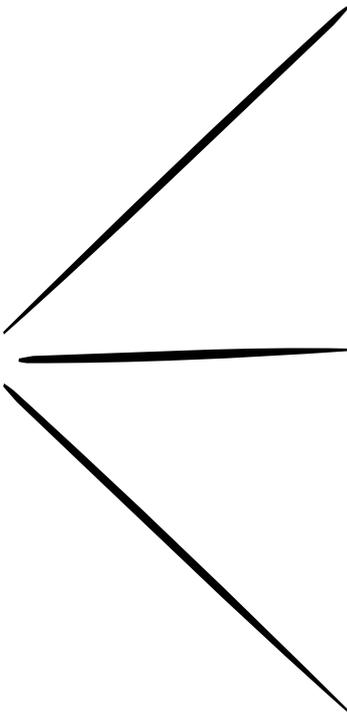
---

# BLUE - Worksheet 33

## TREE DIAGRAMS

The Mahobe Rugby team uses blue jerseys for away games, white jerseys for home games, and gray jerseys for practice. The team also uses white or black shorts and white, blue or black socks.

1. Draw a tree diagram to determine the number of possible uniforms.



2. How many different combinations of uniforms are possible?

---

## TABLES OF MONEY

The table below gives monthly repayments when borrowing money.

### Monthly Repayments Schedule

| Loan Amount | 12 mths  | 18 mths | 24 mths | 30 mths | 36 mths | 48 mths | 60 mths |
|-------------|----------|---------|---------|---------|---------|---------|---------|
|             | Rate 22% | 22%     | 22%     | 22%     | 22%     | 22%     | 22%     |
| \$500       | 46.80    | 32.86   | 25.94   | 21.82   | 19.10   | 15.75   | 13.81   |
| \$1 000     | 93.59    | 65.73   | 51.88   | 43.63   | 38.19   | 31.51   | 27.62   |
| \$2 000     | 187.18   | 131.46  | 103.76  | 87.26   | 76.38   | 63.02   | 55.24   |
| \$3 000     | 280.77   | 197.19  | 155.64  | 130.89  | 114.57  | 94.53   | 82.86   |
| \$4 000     | 374.36   | 262.92  | 207.52  | 174.52  | 152.76  | 126.04  | 110.48  |
| \$5 000     | 467.95   | 328.65  | 259.40  | 218.15  | 190.95  | 157.55  | 138.10  |
| \$6 000     | 561.54   | 394.38  | 311.28  | 261.78  | 229.14  | 189.06  | 165.72  |
| \$7 000     | 655.13   | 460.11  | 363.16  | 305.41  | 267.33  | 220.57  | 193.34  |
| \$8 000     | 748.72   | 525.84  | 415.04  | 349.04  | 305.52  | 252.08  | 220.96  |
| \$9 000     | 842.31   | 591.57  | 466.92  | 392.67  | 343.71  | 283.59  | 248.58  |
| \$10 000    | 935.90   | 657.30  | 518.80  | 426.30  | 381.90  | 315.10  | 276.20  |
| \$15 000    | 1403.90  | 985.95  | 778.20  | 654.45  | 572.85  | 472.65  | 414.30  |
| \$20 000    | 1871.80  | 1314.60 | 1037.60 | 872.60  | 763.80  | 630.20  | 552.40  |

1. What is the interest rate given in the table?  

---
2. What are the monthly repayments on borrowing \$10,000 for 48 months?  

---
3. What is the total amount in repayments if \$20 000 is borrowed over 36 months?  

---

---
4. Samantha wants to purchase a \$10 000 car. She has a deposit of \$3 000 and intends to borrow the balance over 2 years. What will be the total cost of the car?  

---

---
5. Petra can afford \$200 per month. She wants to buy a car in the \$2 000 to \$5 000 range. What term of loan would you suggest?  

---

---

## MEASUREMENT

A conference hall, the plan view of which is below, is about to have its floor carpeted. The carpet comes in rolls 2 metres wide, and costs \$145 per metre. The Newlay Carpet Company quotes a total price of \$6,820 which includes the carpet cost and 8 hours labour.

1. How much does the Newlay Carpet Company charge per hour for labour?

---

---

---

---

---

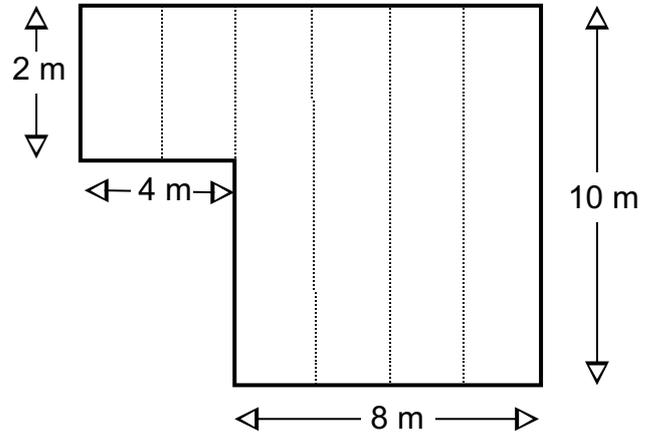
---

---

---

---

---



2. A garden sprinkler rotates in a circular motion watering all the grass within a radius of 50 m. Calculate the area of ground that the water covers.

---

---

---

---

---

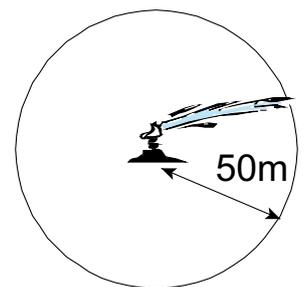
---

---

---

---

---



3. A 400 metre athletic track has straights of length 95 m. What is the radius of both the curves on the end of the track?

---

---

---

---

---

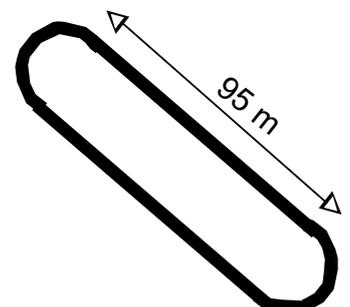
---

---

---

---

---



## MISSION NUTRITION

The NZ Government requires food manufacturers to label their products with an analysis of nutritional content. The sample label below comes from a prepacked Beef Lasagne dinner.

1. How many people is the Beef Lasagne dinner designed to feed?

---

2. The label states that a serving contains 3 grams of saturated fat. This is 15% of the daily value recommended for a 2000-Calorie diet.

How many grams of saturated fat are recommended for a 2000-Calorie diet?

---

---

---

3. There are 470 milligrams of salt (sodium) in the Beef Lasagne dinner. This is 20% of the recommended daily value. What is the recommended daily value of sodium?

---

---

4. A healthy diet, should have no more than 30 percent of total calories coming from fat. What percent of the calories in a serving of this Beef Lasagne come from fat?

---

---

---

5. Joseph hasn't eaten all day so eats a whole Beef Lasagne dinner when he gets home in the evening. Is he getting the correct nutritional intake?

---

---

---

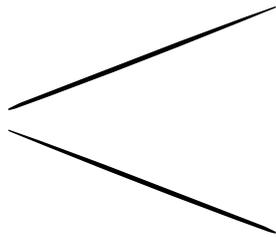
| Nutrition Facts   |              |
|---|--------------|
| Serving Size 1 cup (218g).<br>Servings per container 2. |              |
| 250 calories per serving.<br>110 calories from fat.     |              |
|   | %Daily value |
| Total Fat 12g   | 18%          |
| Saturated Fat 3g  | 15%          |
| Cholesterol 30mg  | 10%          |
| Sodium 470mg  | 20%          |
| Total Carbohydrate 35g                                  | 10%          |
| Dietary Fiber 0g  | 0%           |
| Sugars 8g   |              |
| Protein 10g   |              |
| Vitamin A 5%  | Vitamin C 3% |
| Calcium 20%   | Iron 5%      |

# BLUE - Worksheet 34

## POISONING PROBABILITY

A car workshop uses two carbon monoxide detectors to protect its mechanics from any potential poisoning. If carbon monoxide is present, then there is a 98% chance that sensor 1 will detect it and a 95% chance that sensor 2 will detect it.

1. Complete the probability tree below that illustrates this situation.



2. If carbon monoxide is present, there is a probability that it will not be detected. Write a statement backed up by figures that tells the workshop owner the possibility of carbon monoxide poisoning.

---

---

---

---

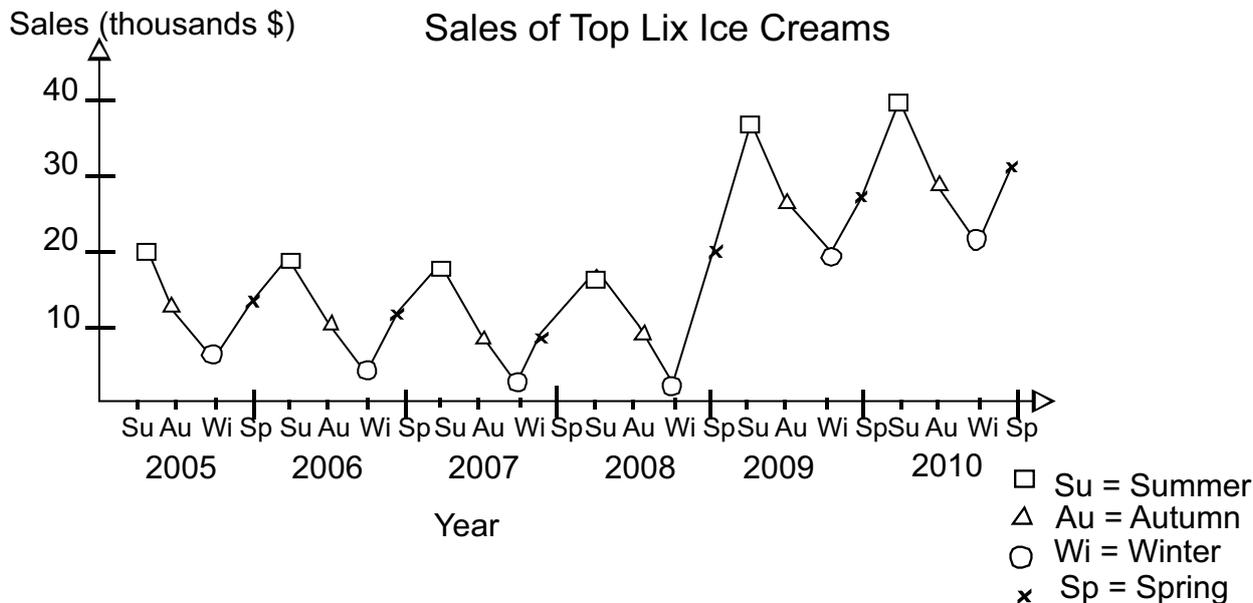
---

---

---

---





### TIME SERIES

Graeme owns an ice-cream van and a business called Top Lix. Graeme keeps a record of his sales over 6 years. During 2009, Graeme increases his sales area and working hours in an effort to get more business. The graph above uses the data from all his sales records.

- Use the graph to write about sales at Top Lix. You should be able to identify at least 3 features of the graph.

---



---



---

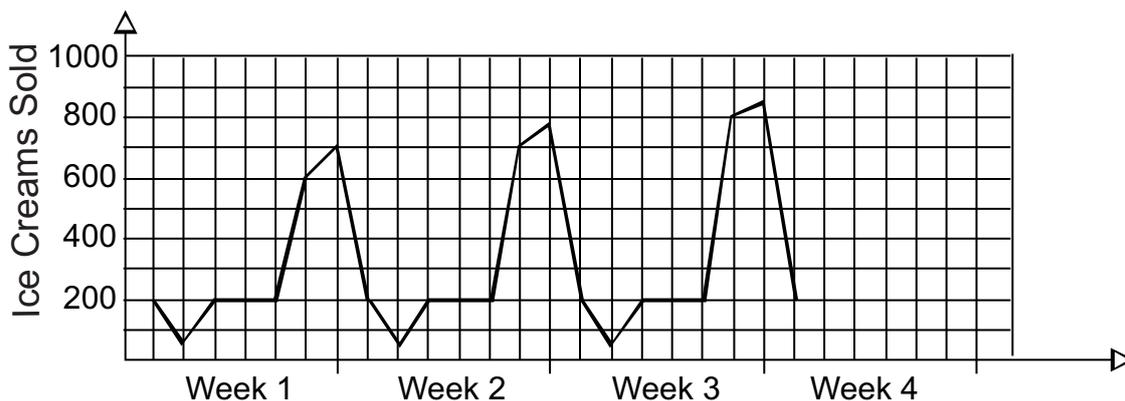


---



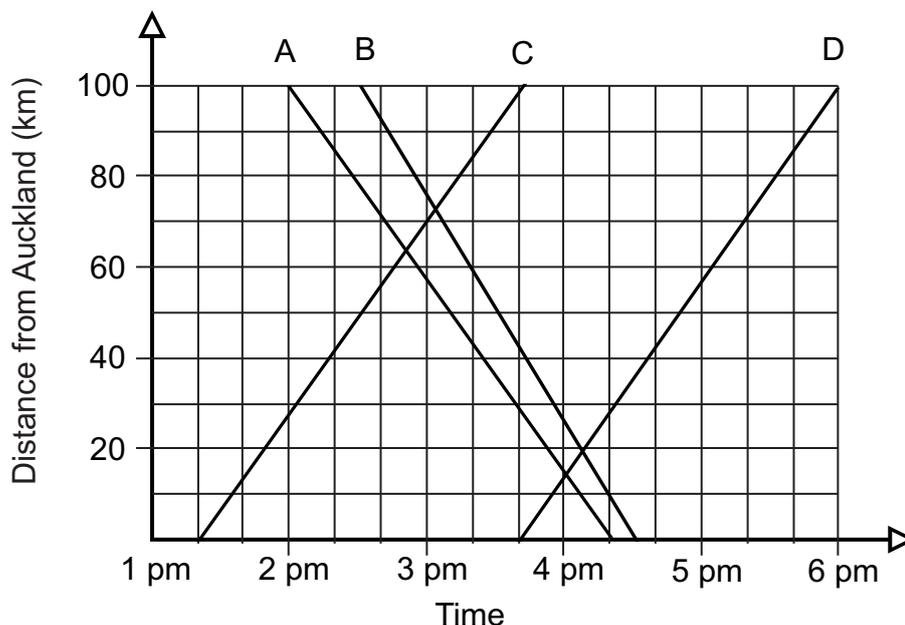
---

- Graeme decides to buy another ice cream van to service Oceanside Beach. He employs Mrs Barraclough to operate the van and asks her to record the number of ice-creams sold each day. Below is a graph of her sales figures for the first three weeks. Complete the graph for Week 4 so that the trend of the first 3 weeks is continued.



## GRAPHS

The graph below represents the time taken for 4 trains (A, B, C & D) travelling between Auckland and Hamilton.



1. According to the graph, what is the distance between Auckland and Hamilton?  

---

---
2. Which of the trains travel at the same speed?  

---

---
3. What is the average speed of Train A?  

---

---
4. In the graph, some lines representing the trains' travel are drawn "upwards" while the others are drawn "downwards". Explain why they are drawn this way.  

---

---

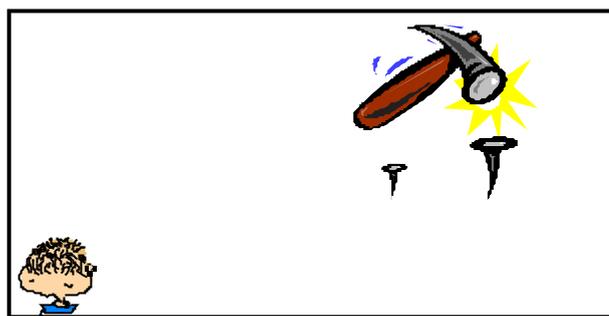
---

# BLUE - Worksheet 35

## REFLECTION

## REFLECTION

1. The pictures below are two views of a person outside a shop window. Complete the second picture (the sign from inside the shop).



## RATIOS AND AREA

A kite similar to the one in the diagram below is made with 2 sticks. The ratio of the width to height is 2:3.

1. Complete the table:



| Width | Height |
|-------|--------|
| 2 m   |        |
|       | 300 cm |
| 1 m   |        |
|       | 42 cm  |

2. Tony makes a bird shaped kite. The pattern shown is used to design the shape. He uses a 50 cm square piece of nylon material. If the nylon is divided into 100 squares (each with sides of 5 cm), find the approximate area of nylon used in the kite.

---



---



---



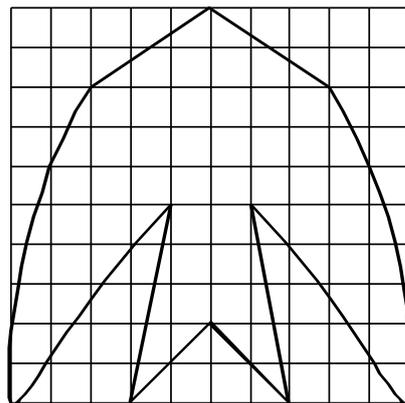
---



---



---



## GRAPHS

Complete the table of values.

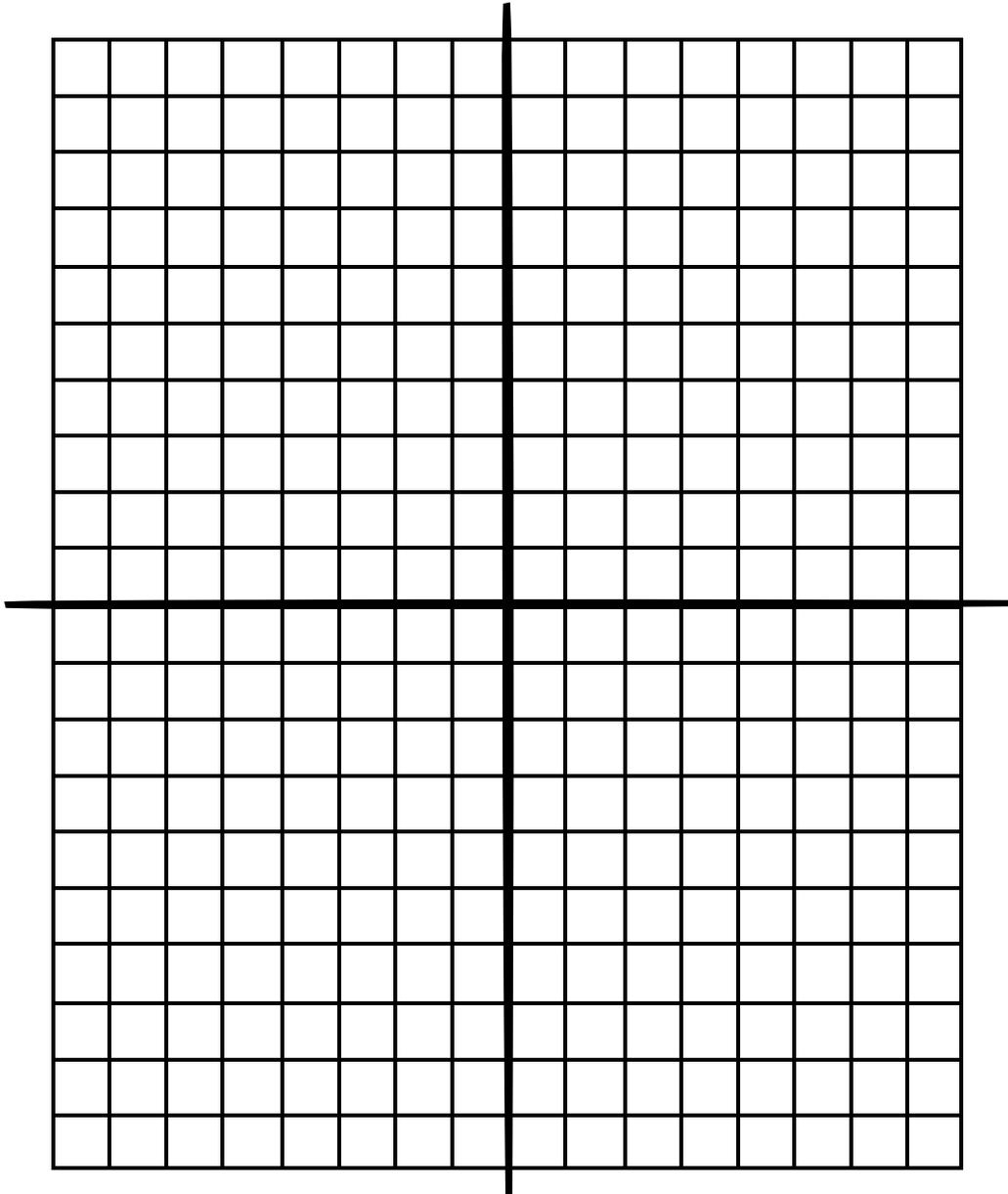
On the grid provided, draw graphs of each line.

1.

| x            | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|--------------|----|----|----|---|---|---|---|
| $y = 2x - 4$ |    |    |    |   |   |   |   |

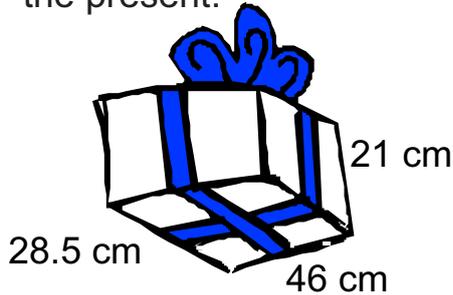
2.

| x            | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|--------------|----|----|----|---|---|---|---|
| $y = 3x + 1$ |    |    |    |   |   |   |   |



## MEASUREMENT

1. A birthday present is tied with a ribbon similar to the diagram below. If the top knot takes 30 cm of ribbon, calculate the total ribbon needed for the present.




---



---

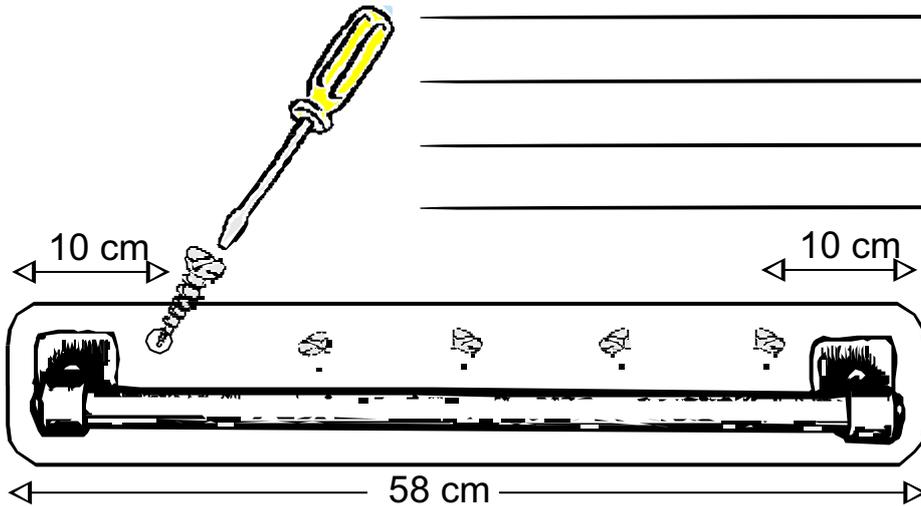


---



---

2. A 58 cm long towel rail has five screw holes. The holes are 10 cm from each end and then placed at equally spaced intervals. What is the distance, in millimetres, between each of the screw holes?




---



---



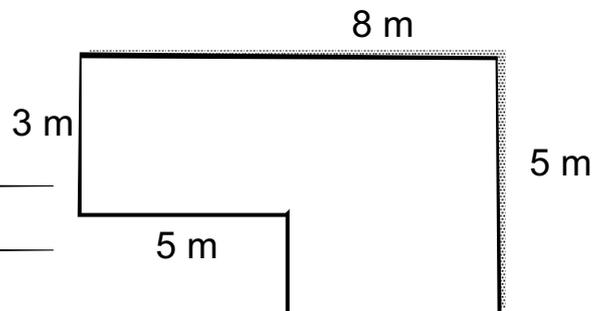
---



---

A courtyard similar to the one below is being laid with concrete. Before the concrete is laid, wooden boxing is placed around the perimeter to hold the wet concrete in place until it is dry.

3. How much wooden boxing is required?




---



---



---

4. If a 15 cm thick layer of concrete is poured into the courtyard, how many  $m^3$  of concrete will be used?

---



---



---

## EVERYDAY MATHS

1. Food scientists have tested the effects of freezing cheese and tomato puree filling in lasagna. The filling was frozen to a temperature of  $-21^{\circ}\text{C}$  and then raised by  $235^{\circ}\text{C}$ . What was the final temperature of the filling?
- 

2. The table below shows average temperatures at McMurdo Station from April to September. Find the mean of the temperatures.

|                            |               |               |               |               |               |               |
|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Month                      | Apr           | May           | Jun           | Jul           | Aug           | Sep           |
| Av Temp $^{\circ}\text{C}$ | $-18^{\circ}$ | $-19^{\circ}$ | $-19^{\circ}$ | $-20^{\circ}$ | $-22^{\circ}$ | $-21^{\circ}$ |

---

3. You buy a pattern and enough material to make two pillows. The pattern costs \$5. Each pillow requires \$3.95 worth of fabric and a button that costs \$.75. Find the total cost.
- 

4. You are hiking between two campsites. The distance between the campsites is  $10\frac{1}{5}$  kilometres. You have already hiked  $5\frac{3}{4}$  kilometres. How many more kilometers do you have to hike?
- 

5. A desert tortoise can live for over a year without drinking water. When it does drink, its body weight can increase by 40%. Suppose a desert tortoise weighs 15 kg after a long period without water. How many kg can the tortoise gain when it drinks?
- 

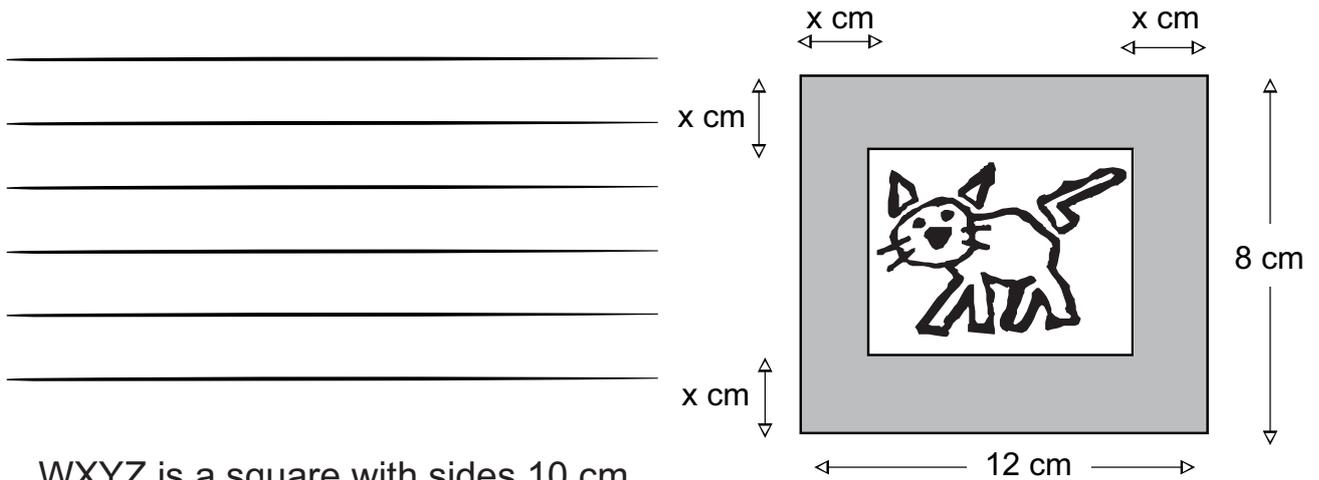
6. In the 2010 World Cup, 5 of the 32 soccer teams that will compete are from South America. What percent of the teams will be from South America?
- 

7. The International Balloon Fiesta takes place every year in Albuquerque, New Mexico. In 2009, 903 balloons participated. In 2010, 1019 balloons participated. By about what percent did the number of balloons increase from 2009 to 2010?
-

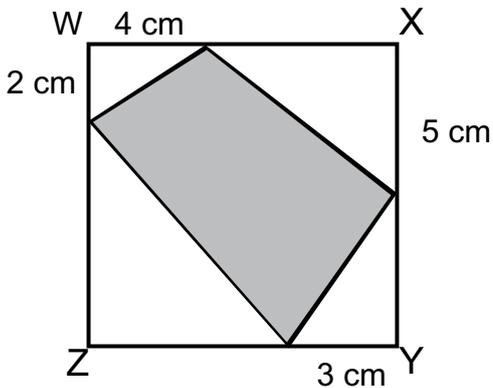
# BLUE - Worksheet 36

## AREA

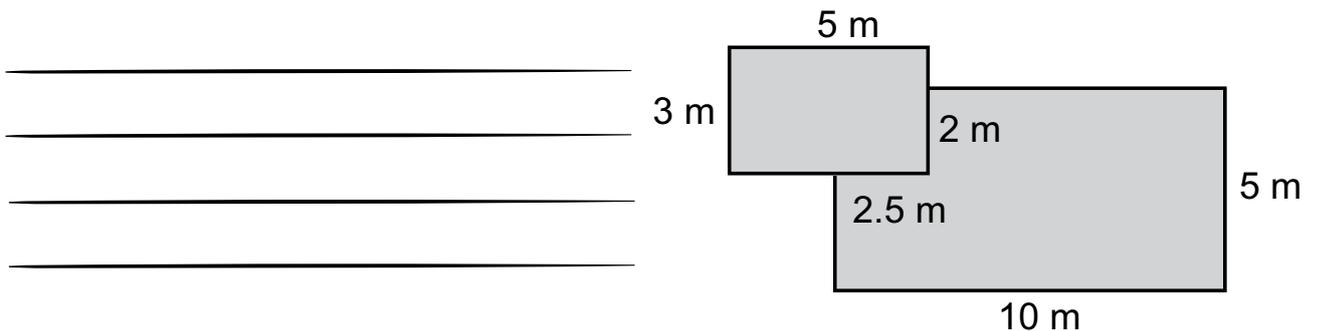
1. Look at the photo below. If  $x = 15$  mm, find the area of the shaded border.



2. WXYZ is a square with sides 10 cm. Find the area of the shaded shape inside the square.

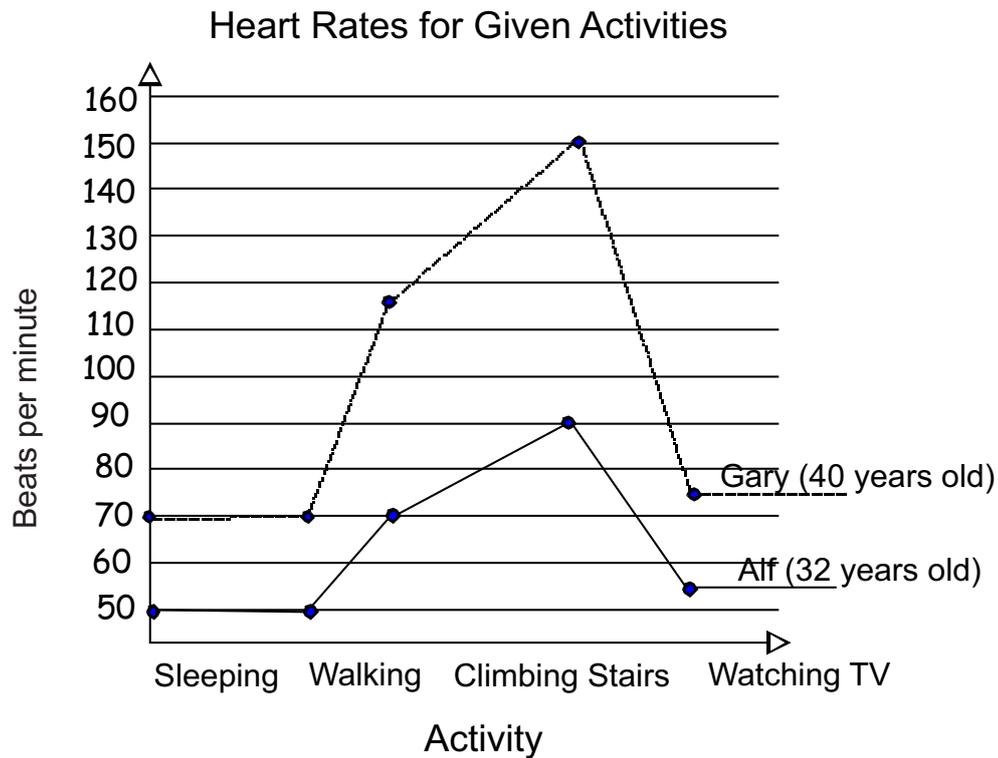


3. The two rectangles shown below overlap. Find the total shaded area.



## INTERPRETING GRAPHS

Alf and Gary both work for the Olympic Engineering Company. They agree to take a fitness assessment which involves taking their pulse rates after various activities.



1. Complete the table below by filling in the pulse rates for different activities.

|      | Sleeping | Walking | Climbing Stairs | TV Watching |
|------|----------|---------|-----------------|-------------|
| Alf  |          |         |                 |             |
| Gary |          |         |                 |             |

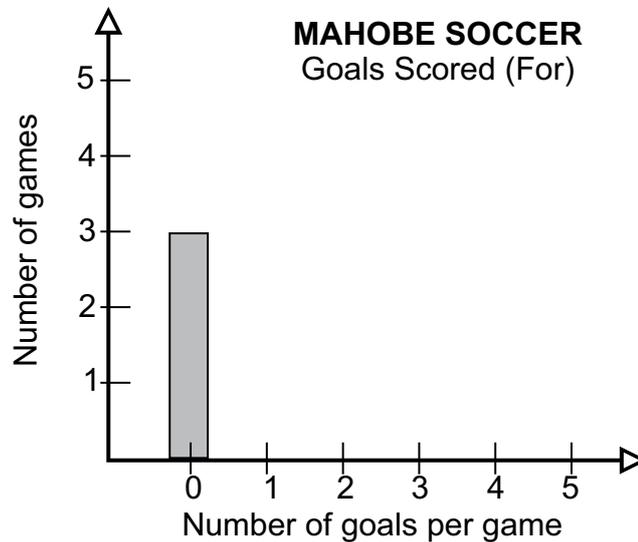
2. After the initial assessment, Gary is advised to start a training programme. He reads the following information in a fitness magazine: "Your ITZ (Ideal Training Zone) is between 70% and 80% of your MHR (Maximum Heart Rate). To calculate your MHR, take your age away from 220." On the graph above shade in the area for Gary's Ideal Training Zone.
3. True / False:  
The average person's heart beats approximately 32 million beats per year. (Assume that the average heart rate is 60 beats per minute.)

## STATISTICS

The Mahobe football team played 12 games last season. Here are the results.

| Game                    | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Result<br>For - Against | 2-1 | 3-2 | 2-0 | 3-1 | 4-1 | 0-5 | 4-3 | 1-0 | 0-0 | 0-2 | 1-1 | 3-1 |

- Organise the data and complete the bar graph for goals scored by the Mahobe soccer team.



- The table below gives the number of spectators at each of the football games. Find the mean, median and mode of the figures.

| Game       | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|
| Attendance | 20 | 19 | 24 | 22 | 20 | 20 | 20 | 23 | 28 | 24 | 26 | 24 |

---

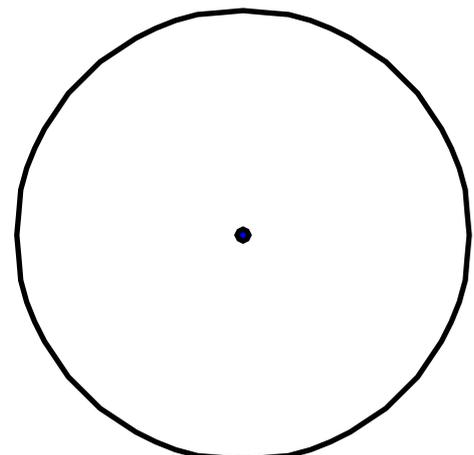


---



---

- The Mahobe Football Club has the following membership:  
20 women, 12 men, 27 under 20's (male), 31 under 20's (female).  
Draw a pie chart illustrating the data.



## REMEMBER PERCENTAGES

1. 15 is what percent of 150?

\_\_\_\_\_

2. 16 is what percent of 40?

\_\_\_\_\_

3. 25 is 20% of what number?

\_\_\_\_\_

4. 50% of what number is 75?

\_\_\_\_\_

5. What percent of 48 is 30?

\_\_\_\_\_

6. What is 150% of 50?

\_\_\_\_\_

7. 5% of what number is 10.2?

\_\_\_\_\_

8. 1 is what percent of 500?

\_\_\_\_\_

9. Find 0.5% of 300

\_\_\_\_\_

10. 15 is what percent of 10?

\_\_\_\_\_

## QUICK QUESTIONS

1.  $5 \times (9 + 3) =$

\_\_\_\_\_

2.  $12 + 6 \times 3^2 =$

\_\_\_\_\_

$a = 2, b = 5, c = 3, d = 1.$

3.  $a^2b + c$

\_\_\_\_\_

4.  $(cd)^3$

\_\_\_\_\_

5.  $c(a + d)$

\_\_\_\_\_

6. Solve  $y = (4.5 + 1.8) - 3.2$

\_\_\_\_\_

7. Solve  $y = 4^2 + 3 \times (4 + 2)$

\_\_\_\_\_

8. Simplify  $2m + 3m$

\_\_\_\_\_

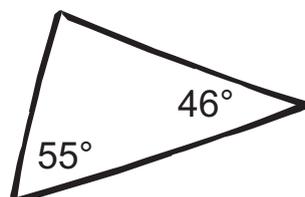
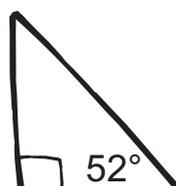
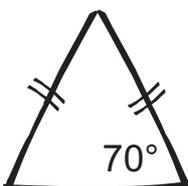
9. Simplify  $8x + 5y + 2x - y$

\_\_\_\_\_

10. Simplify  $3(2a + b)$

\_\_\_\_\_

Calculate each of the missing angles.  
Note: Triangles are not drawn to scale!



# BLUE - Worksheet 37

## Monthly Repayment (per \$1000 borrowed)

| Interest Rate<br>% pa | Term    |         |          |          |
|-----------------------|---------|---------|----------|----------|
|                       | 2 years | 5 years | 10 years | 20 years |
| 12.0                  | 47.07   | 22.24   | 14.35    | 11.01    |
| 12.5                  | 47.31   | 22.50   | 14.64    | 11.36    |
| 13.0                  | 47.54   | 22.75   | 14.93    | 11.72    |
| 13.5                  | 47.78   | 23.01   | 15.23    | 12.44    |
| 14.0                  | 48.01   | 23.27   | 15.83    | 12.80    |
| 14.5                  | 48.25   | 23.53   | 16.13    | 13.17    |
| 15.0                  | 48.49   | 23.79   | 16.44    | 13.57    |

Arthur and Zoe need to borrow some money. The bank sends the Repayment Schedule shown above. It gives the monthly repayment amounts for each \$1000 borrowed.

1. Arthur and Zoe are told that the repayments for any amount borrowed cannot exceed 25% of their total income. Arthur earns \$32 000 per year while Zoe earns \$27 000. What is the maximum monthly repayment that they can afford (rounded to the nearest dollar).

---

---

2. Current interest rates for loans are 12.5%. They will need to borrow the money over 20 years. How much are Arthur and Zoe able to borrow? (Round your answer to the nearest \$1 000.)

---

---

3. After borrowing the money, interest rates increase by 1.5%. How much extra per year will Arthur and Zoe need to pay for their loan?

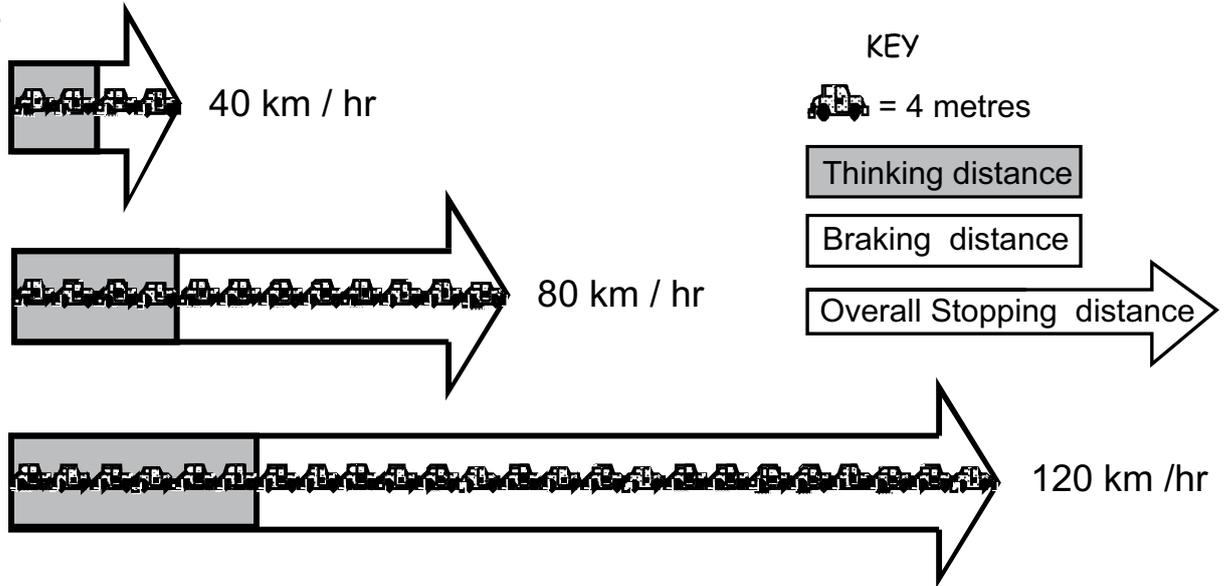
---

---

---

# INTERPRETING GRAPHS

The diagram below gives the stopping distance for cars travelling at different speeds.



1. What is the braking distance at 40 km/hr?  
\_\_\_\_\_
2. What is the thinking distance at 80 km/hr?  
\_\_\_\_\_
3. How much longer is the overall stopping distance at 80 km/hr compared to 40 km/hr?  
\_\_\_\_\_  
\_\_\_\_\_
4. Why does the thinking distance become greater as the speed increases?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What do you estimate the thinking distance, braking distance and overall stopping distance would be for a car speeding at 160 km/hr?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# EVERYDAY MATHEMATICS

## ***Mahobe Insurance Plan (Monthly Charge)***

| <i>Coverage</i>                     | <i>Medical</i> | <i>Dental</i> | <i>Vision</i> |
|-------------------------------------|----------------|---------------|---------------|
| <i>Employee</i>                     | \$88           | \$35          | \$17          |
| <i>Family (additional coverage)</i> | \$55           | \$15          | \$8           |

1. Fabian works for Mahobe, is single and decides to get all three types of insurance. How much will it cost for 12 months?

---

2. If Fabian was to marry Helen, who has 5 year old son, how much would Fabian expect to pay for family medical and dental coverage per year?

---

---

3. In American baseball, a player's average is calculated by dividing the number of times a player is up to bat by the number of hits.

This season, Devereux has 20 hits from 30 bats. His average is 0.667. Burgess has 2 hits from 3 bats. His average is also 0.667.

Both Devereux and Burgess play the next two games. In Game 1 they both have 2 bats for 1 hit each. In Game 2 they both have 3 bats with Devereux getting 1 hit and Burgess getting 2 hits.

Who is the better player?

---

---

---

---

---

---

---

4. The "bit depth" of a computer's colour monitor is the number of colours that it can display. Bit depth is expressed as a power of 2. This means that a 32 bit monitor can display  $2^{32}$  colours. Use this information to calculate the number of colours an 8 bit monitor can display.

---

## INVESTIGATIONS

If you double the radius of a circle, what happens to the circle's circumference and what happens to its area?

1. Calculate this for a few circles using a different radius for each circle.

---

---

---

---

---

---

---

---

The "Rule of 72" is a compounding interest rule that states money invested will double in value in  $\frac{72}{r}$  years if invested at an annual compounded interest rate of  $r\%$ . For example if you invest \$1000 at 6% compounded interest then your investment will be worth \$2000 in  $\frac{72}{6}$  (12) years.

2. What is meant by compounding interest?

---

---

3. By using 2 or 3 different interest rates, show that the "Rule of 72" is valid.

---

---

---

---

---

---

---

---

# BLUE - Worksheet 38

## MEASUREMENT

1. An electrician completes three jobs on a particular working day. On the first he works from 8.35 am to 11.15 am, on the second he works from 11.40 am to 2.30 pm and on the third he works from 3.10 pm to 5.55 pm. What was the average time taken for the three jobs?

---

---

---

---

---

---

---

---

2. Look at the two lines below.  
AB = 54 mm, CD = 29 mm and CB (the overlap) = 13 mm.



Find the length of AD.

---

---

A hectare is a piece of land which has the same area as a square with sides  $100\text{ m} \times 100\text{ m}$ .

3. How many hectares are in a farm with an area of  $55\,000\text{ m}^2$ ?

---

---

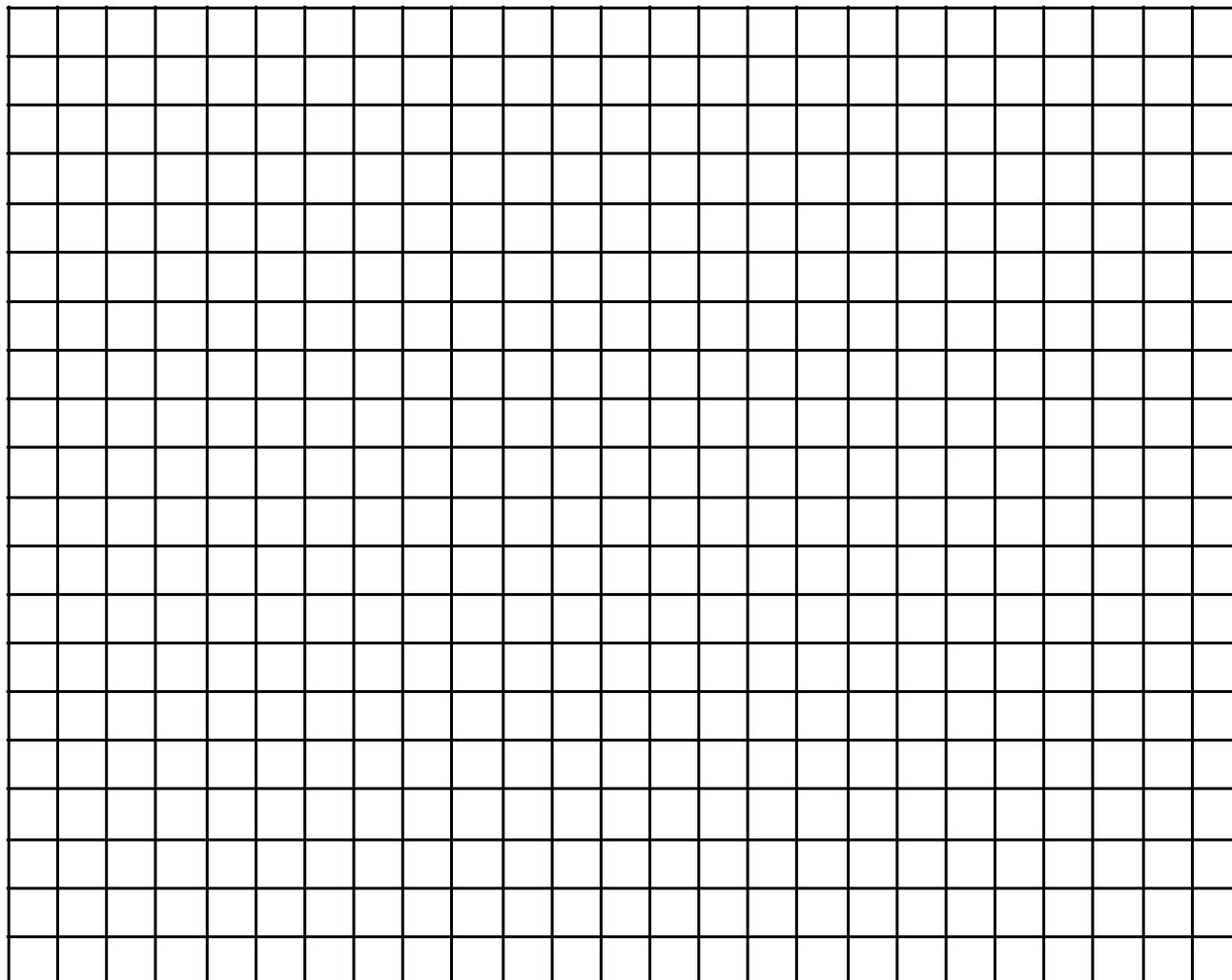
4. If 15 bags of fertiliser are needed for 20 hectares, how many bags are needed for  $55\,000\text{ m}^2$ ?

---

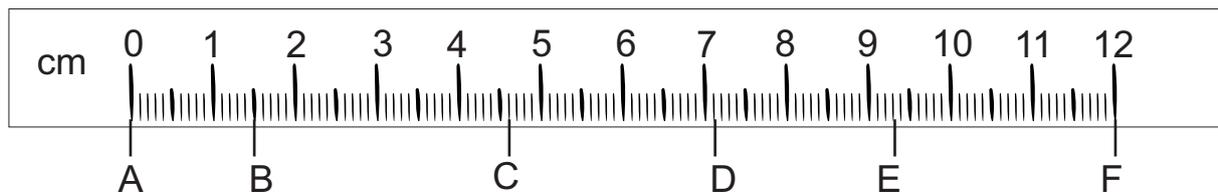
---

A triangle has co-ordinates A(4,1), B (8,4) and C(2,2).

- Use the grid below to draw some X and Y axes. Then draw the triangle ABC.
- Enlarge the figure ABC by a scale factor of 2.5 through the centre point O (0,0). Call the new figure A'B'C'.



### MEASUREMENT



Write the length of: BC \_\_\_\_\_ CD \_\_\_\_\_ BE \_\_\_\_\_ DF \_\_\_\_\_

## INVESTIGATIONS

Stage 1: You send a text to 4 friends.

Stage 2: Each friend sends the text on to 4 more friends.

Stage 3: Each of these friends sends to 4 more friends.

1. The scenario is illustrated below. Find the number of texts sent at Stage 9.

|         |          |
|---------|----------|
| Stage 1 | 4 texts  |
| Stage 2 | 16 texts |
| Stage 3 | 64 texts |

---

---

---

---

---

---

---

---

2. At what Stage will there be more than 1 million texts sent?

---

---

Digital cameras capture images in a matrix (rows and columns) of pixels. A pixel is a small rectangular dot. The more pixels in the image, the greater the detail.

3. A megapixel is 1,000,000 pixels. Jason's camera produces an image that has 1280 pixels in a row and 1024 pixels in a column. What are the total number of megapixels pixels in each image?

---

---

4. Many digital centres measure photos in inches.  
Let  $l$  and  $w$  be the length and width of a photo in inches.

Let  $M$  be the number of megapixels in the image.

A printed photo is considered acceptable if the value of the expression  $\frac{M}{lw}$  is greater than 0.017

Can Jason produce an 8 inch by 10 inch print of the image in his camera?

---

---

---

## EVERYDAY MATHEMATICS

The number of calories in a serving of food is the sum of the calories from carbohydrate, protein, and fat. The table below shows the number of calories in 1 gram of carbohydrate, protein and fat.

|                     | <i>Calories in 1 gram</i> |
|---------------------|---------------------------|
| <i>Carbohydrate</i> | 4                         |
| <i>Protein</i>      | 4                         |
| <i>Fat</i>          | 9                         |

1. A cup of milk has 11 g of carbohydrate, 8 g of protein, and 8 g of fat. How many calories are there in a cup of whole milk?

---

---

Doctors measure cholesterol in blood to see if there is any risk of heart disease. The formula below gives total cholesterol level in terms of LDL (Low-density lipoprotein or “bad”) cholesterol, HDL (High-density lipoprotein) or “good” cholesterol, and your triglycerides.

$$\text{Total cholesterol} = \text{LDL} + \text{HDL} + \frac{\text{Triglycerides}}{5}$$

All the values are measured in milligrams per deciliter (mg/dL) of blood.

2. Raymond has his cholesterol levels is checked by a doctor. The lab results are show below.

$$\begin{aligned} \text{Total} &= 210 \text{ mg/dL} \\ \text{LDL} &= ? \\ \text{HDL} &= 45 \text{ mg/dL} \\ \text{Triglycerides} &= 125 \text{ mg/dL} \end{aligned}$$

Find Raymonds LDL level.

---

---

---

3. For teenagers, LDL levels below 110 mg/dL are considered acceptable. Levels from 110 mg/dL to 129 mg/dL are borderline, and levels of 130 mg/dL or greater are considered too high. Given that Raymond is a teenager, classify his LDL level as acceptable, borderline, or too high.

---

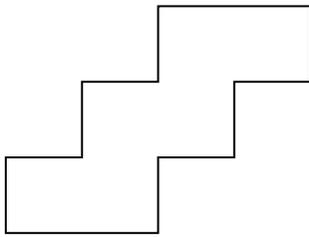
---

# BLUE - Worksheet 39

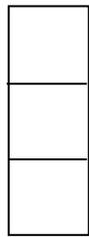
## SHAPE AND SPACE

On the grid below, draw isometric views of each shape pictured.

Top View



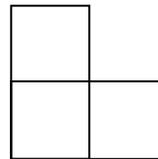
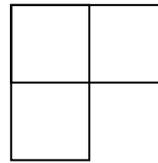
Side View



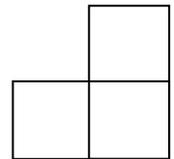
End View

Shape ONE

Top View

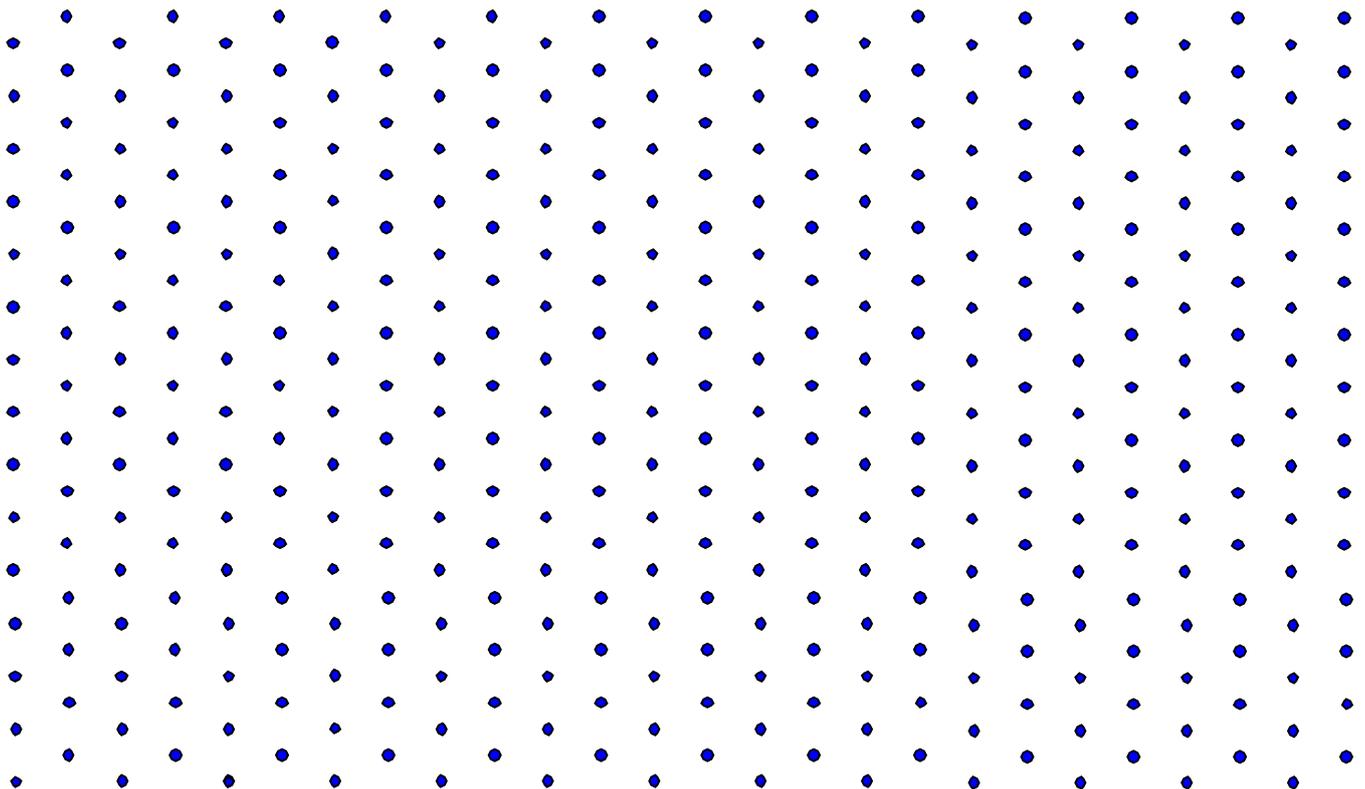


Side View



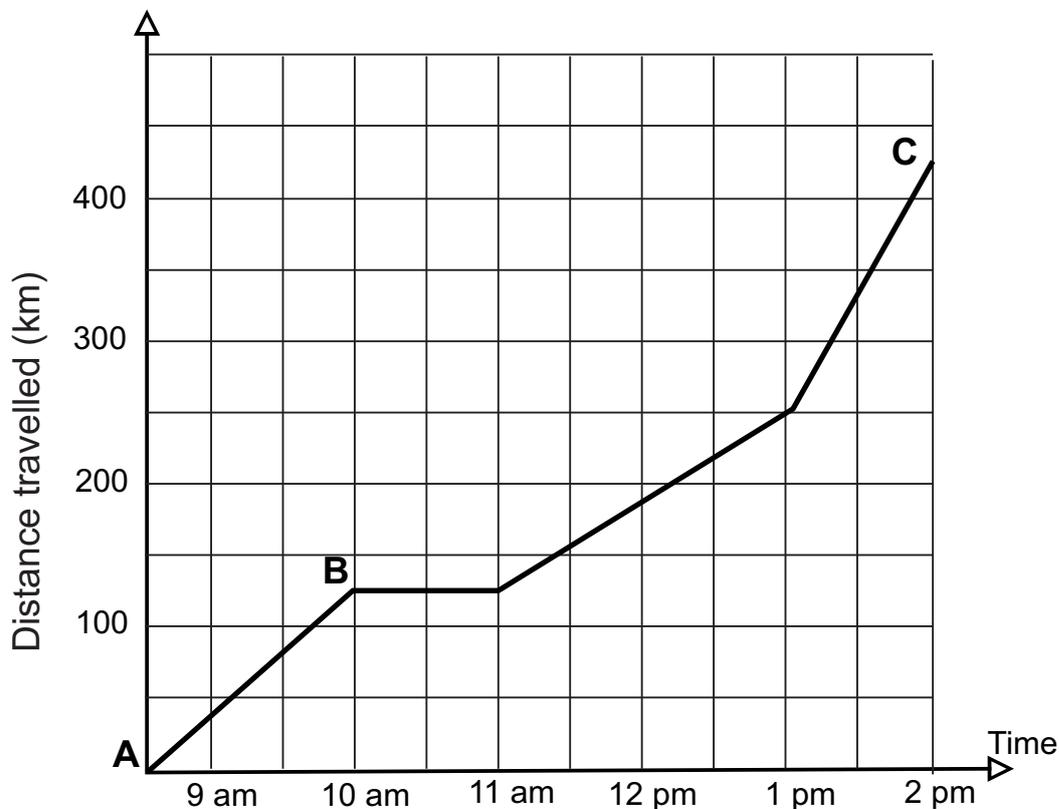
End View

Shape TWO



## GRAPHS

Helen is a saleswoman. She travels the country selling books to retail outlets. The graph below, shows her car journey, on one trip last week, driving from Manukau (A), through Hamilton (B), where she visits some booksellers, then on to Hastings (C).



1. At what time did Helen reach Hamilton?  
\_\_\_\_\_
2. How long did Helen stay at Hamilton?  
\_\_\_\_\_
3. Between Hamilton and Hastings, the graph line changes. What could have happened?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. What was Helen's average speed for the whole journey?  
\_\_\_\_\_  
\_\_\_\_\_

## EVERYDAY MATHS

In 1694, the English ship Sussex sank in the Mediterranean Sea while on a journey to Spain. In 2002, the ship was discovered under the sea and both the salvage company, Odyssey, and the government of England agreed to share any money that resulted from the sale of gold and silver coins recovered from the wreckage.

1. It was agreed that Odyssey would get 80% of the first \$45 million of the sales. What is 80% of \$45 million?

---

---

2. The salvage company would then get 50% of any sales between \$45 million and \$500 million. If sales totaled \$500 million, how much money would Odyssey get?

---

---

3. Odyssey will receive 40% of sales over \$500 million. In all, they found over 17 tons of gold and silver coins. It is probably the biggest ever treasure hoard found and there is still a dispute over who really owns it. Therefore the sale of all the treasure has still not taken place. If sales of the treasure total \$1 billion how much money will the Odyssey get?

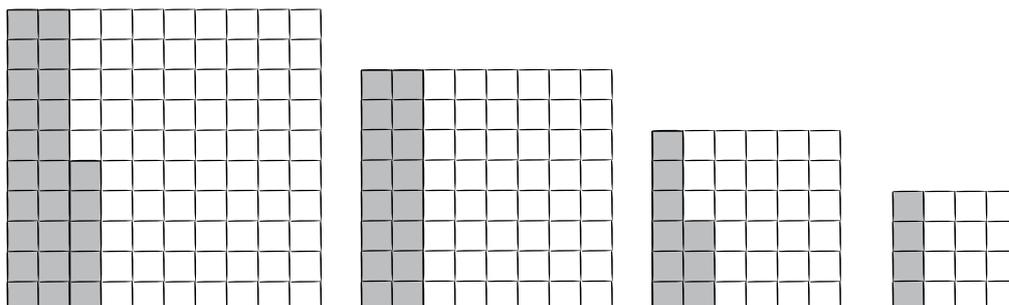
---

---

---

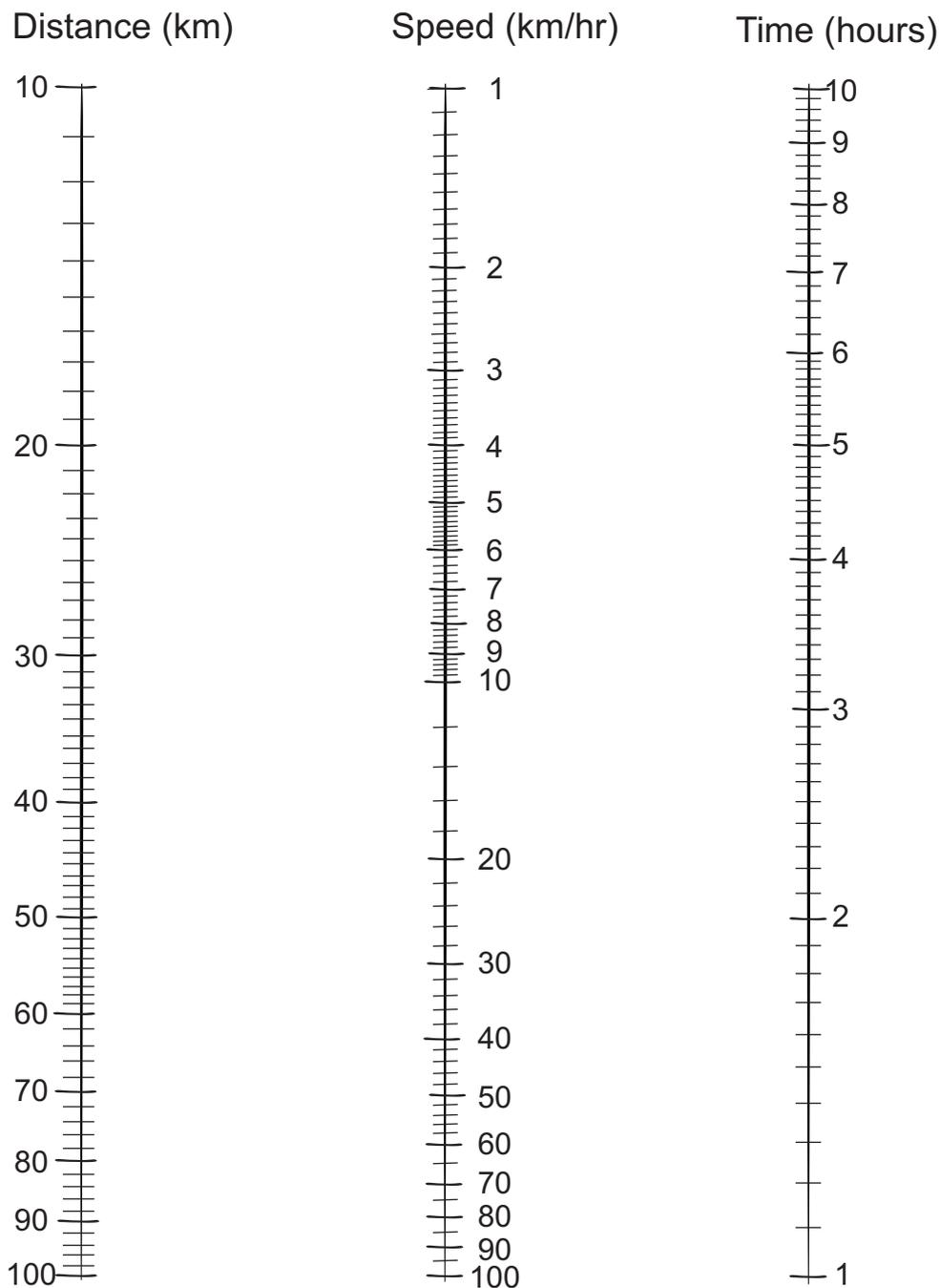
## PERCENTAGE INVESTIGATION

4. Draw the grid that represents the fifth figure.



## SPEED NOMOGRAM

The nomogram below can be helpful for working out distance, time and average speed. Use it to answer the questions below.



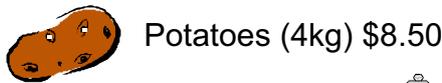
- A cyclist travels 70 km in  $2\frac{1}{2}$  hours.  
 What is his average speed? \_\_\_\_\_
- A train travels for  $1\frac{1}{2}$  hours at an average speed of 65 km./hr.  
 What distance does it travel?  
 \_\_\_\_\_
- What is the time taken by an athlete running in a 20 km race at an average speed of 16 km/hr?  
 \_\_\_\_\_

# BLUE - Worksheet 40

## Better Price Supermarkets



Butter \$4.95



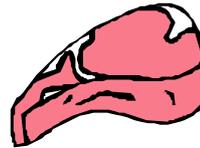
Dishwashing Liquid \$3.25

### NUMBER

Graeme sees the Supermarket advertisement above and buys the items on the shopping list below.

- Fill out the price of each item on the shopping list, then find the total cost of the shopping.

- 1 loaf of bread \_\_\_\_\_
- 1 pack of butter \_\_\_\_\_
- ½ kilo of prime steak \_\_\_\_\_
- 2 bags of apples \_\_\_\_\_
- 9 oranges \_\_\_\_\_
- Total \_\_\_\_\_



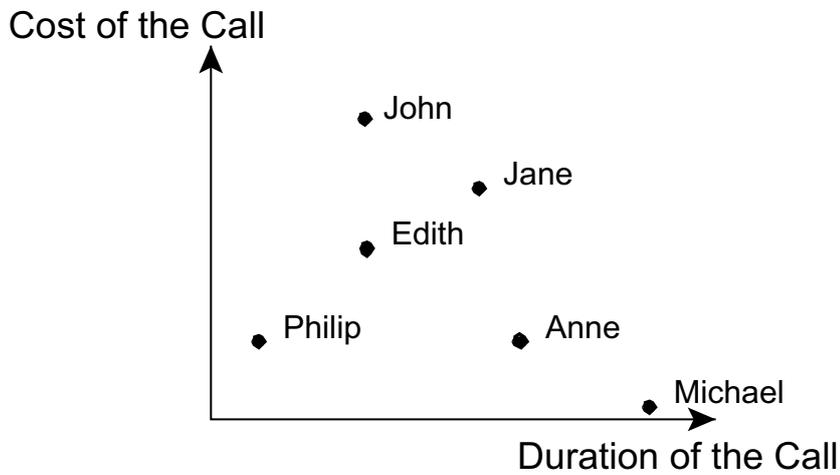
- The supermarket always rounds its prices down to the nearest 5 or 10 cents. What will Graeme pay for his goods? \_\_\_\_\_

- Graeme pays for his purchases with a \$50 note. How much change will he receive? \_\_\_\_\_

- A 2 litre carton of ice cream costs \$5 and a 3 litre carton costs \$8. Which is the best value for money? \_\_\_\_\_

## INTERPRETING GRAPHS

One weekend, 5 people made phone calls to various parts of the country. They recorded both the costs of their calls and also the times they were on the phone. A graph of their data is shown below.



1. Who is most likely to be calling long distance? Explain your reason.

---

---

---

2. Who is the most likely to be making a local call? Explain your reason.

---

---

---

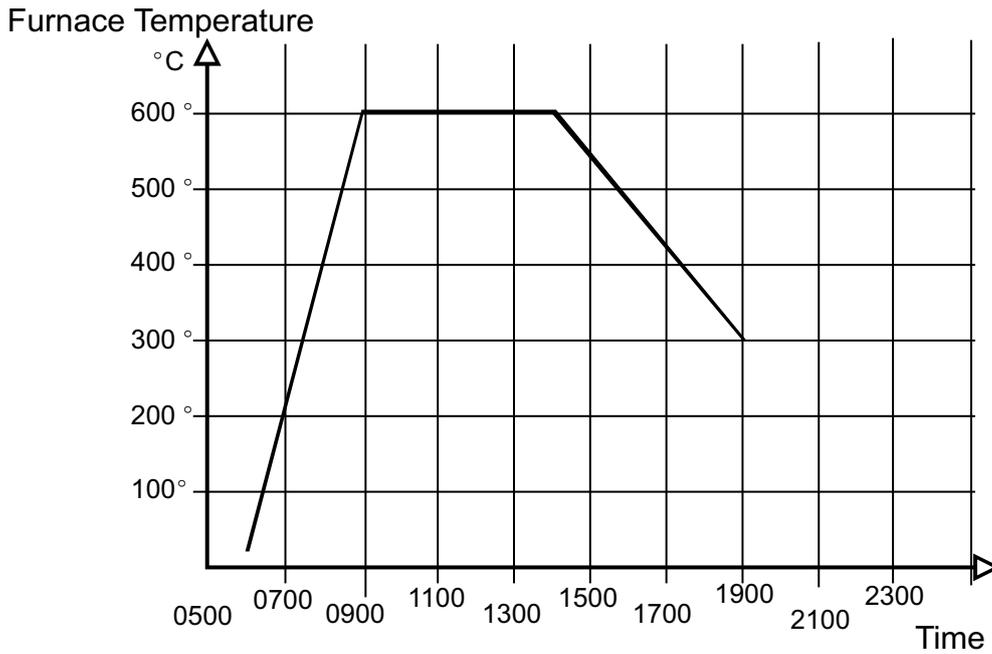
3. Which people were dialling (approximately) the same distance? Explain your answer.

---

---

---

# INTERPRETING GRAPHS



1. Give 3 pieces of information about the furnace that can be gained from this graph.

i.

---

---

ii.

---

---

iii.

---

---

2. Does the furnace heat up or cool down quicker? Explain your answer.

---

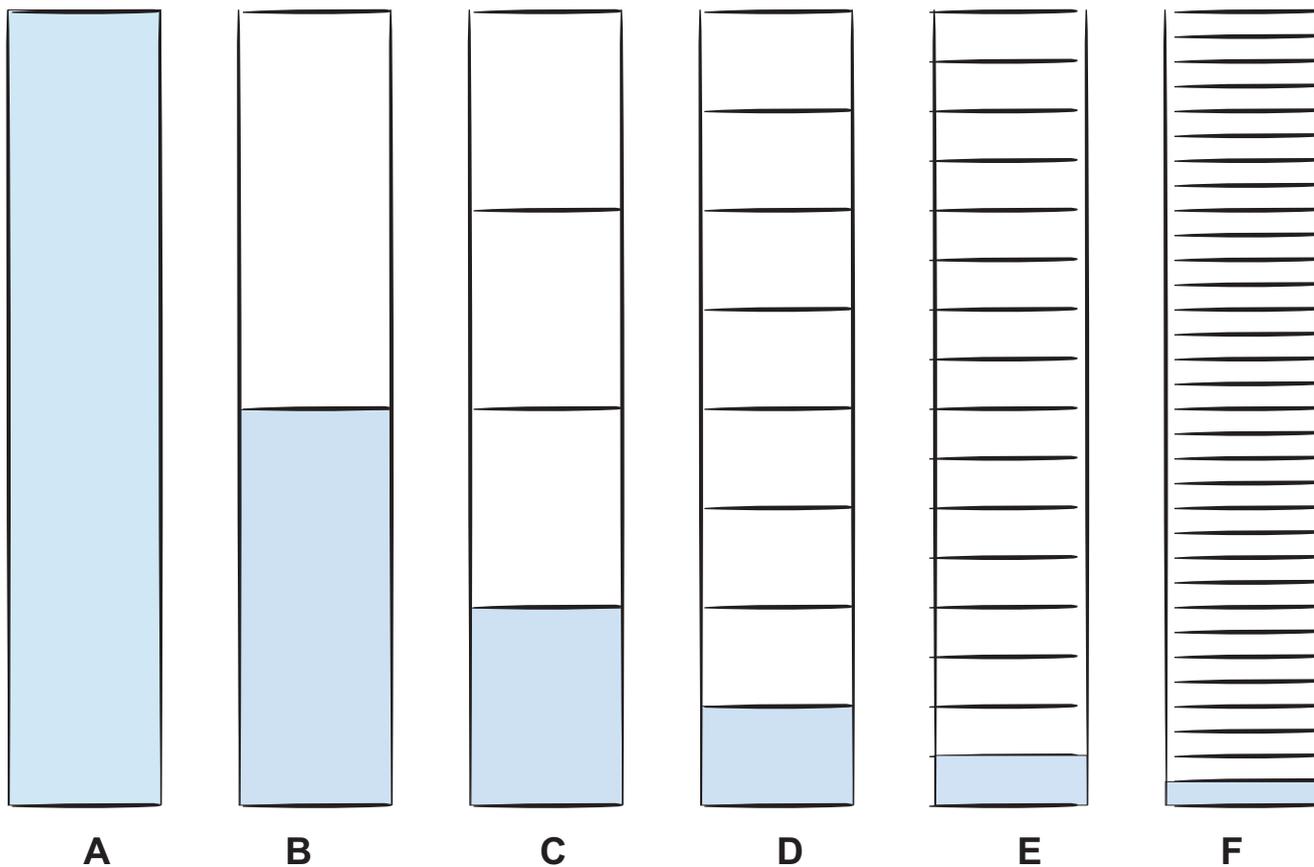
---

3. The school's caretaker has to perform maintenance work on part of the furnace. Calculate, the time when it will cool down below 20°C. Assume that it continues to cool at the same rate.

---

---

# FRACTIONS



Look at the rectangles above. Parts of each are shaded.

1. Write down each fraction that is shaded.

|       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| A     | B     | C     | D     | E     | F     |
| _____ | _____ | _____ | _____ | _____ | _____ |

2. What fraction is:

|         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|
| C of B? | D of B? | E of B? | F of B? | E of C? | F of D? |
| _____   | _____   | _____   | _____   | _____   | _____   |

3. Write the fraction illustrated by D in 3 different ways.

---

4. If you added all the shaded blocks together, what would be the value of the resultant block?

---