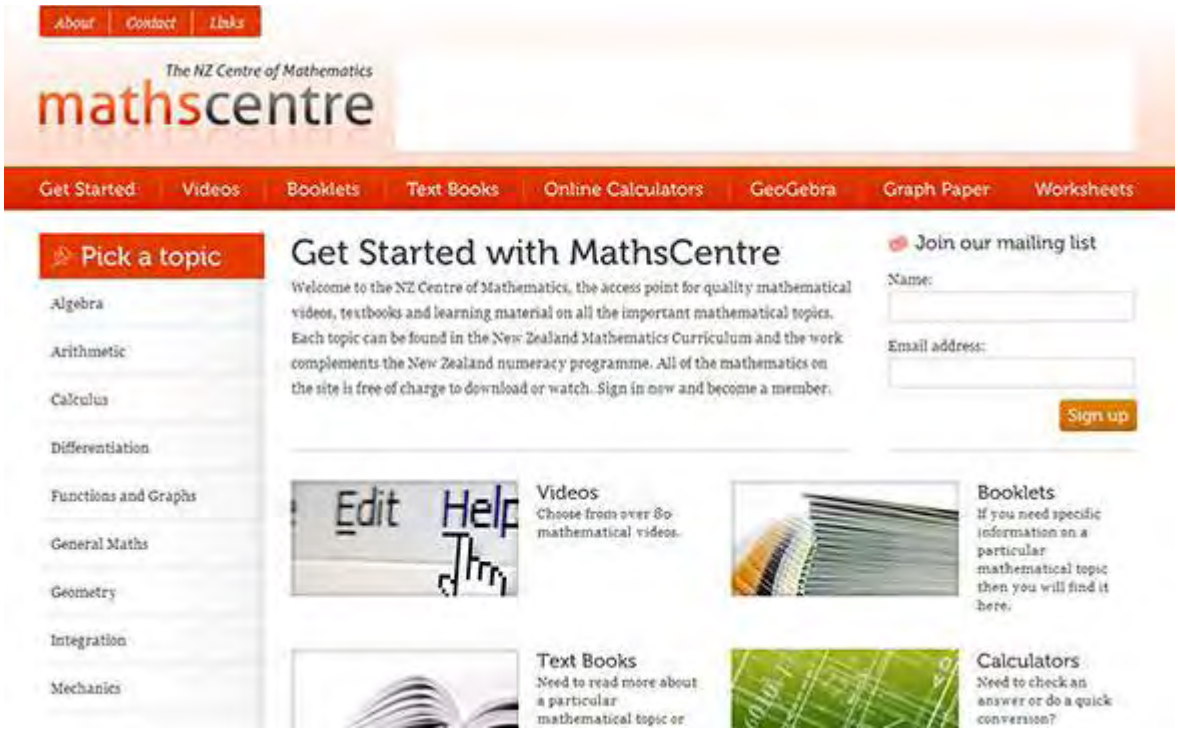
AS 91027

Aiming for Achievement

Worksheets



1.2 Apply algebraic procedures in solving problems

4 credits

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AS91027 Apply Algebraic Procedures in Solving Problems

Aiming for Achievement Worksheets

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Practice Substitution

If $a = 4$ and $b = 5$

1. $a + 8 =$

2. $3b =$

3. $2a + 9 =$

4. $a^2 + a^2 =$

5. $30 \div b =$

6. $2b + 3 =$

7. $a^2 + \mathrm{b} =$

8. $24 - 4b =$

9. $a + b =$

10. $5a - 2b =$

11. $2b - a =$

12. $2(a + b) =$

13. $a + b^2 =$

14. $10a - 2b^2 =$

15. $b^2 - a^2 =$

16. $3(2a + 2b) =$

17. $5a^2 + 2b^2 =$

18. $8b^2(a - 2) =$

19. $2.5(a^2 - 2b) =$

20. $2\mathrm{b}(1.5a + 2b) =$

Substitution Word Problems

Ordering Takeaways

Fish is $5.50 per piece
Chips are $3 per scoop

1. What is the cost of 2 pieces of fish?

2. What is the cost of one scoop of chips and 1 piece of fish?

3. What is the cost of 2 fish and 2 scoops of chips?

4. What is the cost of 4 fish and 3 scoops of chips?

5. What did I buy if I spent $14?

6. What did I buy if I spent $28?

7. If I spent $11.50 what could I buy?

8. 14 people order hamburgers. The very hungry ones order 2 each while the rest order 1 each. They purchase a total of 20 hamburgers. How many people were very hungry?

Practice More Substitution

If $a = 5$, $b = 3$ and $c = -2$ calculate:

1. $5a =$

2. $c + c^2 =$

3. $2a + b =$

4. $4(a + c) =$

5. $2(b - c) =$

6. $3a + 4c =$

7. $-2a + -2c =$

8. $b^2 - 6a =$

9. $10a - 2b =$

10. $2(4a + b^2) =$

11. $\dfrac{a+b}{c} =$

12. $\dfrac{a+4}{b^2} =$

13. $\dfrac{2(8-c)}{2a} =$

14. $\sqrt{b^2+(2c)^2} =$

15. $\dfrac{c^2}{0.5(a+b)} =$

16. $\dfrac{abc}{-10} =$

Collecting Like Terms

Simplify:

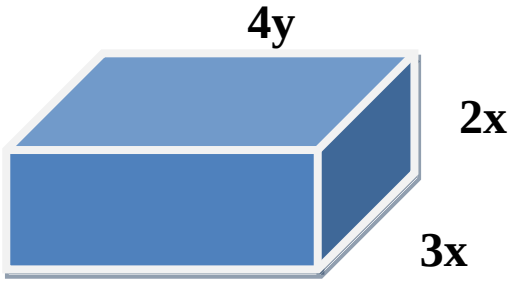
1. $5x + 3y - 2x + 9y =$

2. $5m^2 + 3n + 2m^2 - 2n =$

3. $3p^3 - 5q^2 + 9p^3 - 8q^2 =$

4. $-3x^2 + 4x + 12x^2 - 12x =$

5. Find the total length of all the edges of this cuboid.



Simplify:

6. $14a^2 - 10b - a^2 + 5b =$

7. $22xyz + 12xy - 5xyz + 4x =$

8. $8pq + 7p + q + 10pq - q - p =$

9. $13x^2 + 4x^2 - 5y^2 + y^2 - 12x^2 =$

10. $11ab + 2cd - ab + 3dc + ba =$

11. $4x - 5x + 3x - x + 2x - 7y =$

12. Which is larger and by how much? $-13 + 8 - 4 + 6 - 3 + 9$

or $-31 + 27 - 3 - 6 + 18$

Multiplying Algebraic Terms

1. $2x \times 6 =$

2. $-4x \times 3y =$

3. $-3x \times -2y =$

4. $4y \times y =$

5. $4 \times t \times t \times t =$

6. $x^5 \times x^5 =$

7. $3m^2 \times 5m^3 =$

8. $2q^2 \times 3q^4 \times 2q =$

9. $(6x^2)^2 =$

10. $-(3c)^2 =$

11. $(2a^2)^3 =$

12. $(7y^{12})^0 =$

Dividing Algebraic Terms

1. $\dfrac{25x^4}{15x} =$

2. $16x^{12} \div 12x^6 =$

3. $\dfrac{9y^6}{6y^{10}} =$

4. $\dfrac{x^3y^4}{x^5y^5} =$

5. $\dfrac{10x^2y^4}{5xy^2} =$

6. $\dfrac{30x^2y^3}{15xy^3} =$

7. $\dfrac{27x^4y^2}{9x^3y} =$

8. $\dfrac{y^4 \times y^4}{y^3 \times y^2} =$

9. $\dfrac{4x^2y^3}{4xy^3} =$

Brackets, Powers and Roots

Simplify:

1. $(x^2)^3 =$

2. $(y^2)^4 =$

3. $(8a^2)^2 =$

4. $(x^2y^5)^2 =$

5. $(2x^3y^2)^5 =$

6. $(5a^2b)^4 =$

7. $\left(\frac{x^2}{y^3}\right)^2 =$

8. $\left(\frac{x^3}{y^2}\right)^4 =$

9. $\left(\frac{2x^2}{x^4}\right)^3 =$

10. $\frac{x^2}{x^2} =$

11. $\frac{x^5}{x^7} =$

12. $(12x^2)^0 =$

13. $5x^0 =$

14. $\frac{(2x)^4}{8x^3} =$

15. $\frac{2x^2 \times 5x^2}{5x^2} =$

16. $\left(\frac{2x^5}{x}\right)^2 =$

17. $x\left(4x^2\right)^3 =$

18. $\sqrt{9x^{16}} =$

19. $\sqrt{64x^{64}} =$

20. $\sqrt[3]{64x^{12}} =$

Order of Operations

Simplify

1. $3y + y \times y$

2. $5 \times (a + a) \times a$

3. $6x + 3x \div x$

4. $3y - 3y \times 2y$

5. $10y + 8y \div y$

6. $2z + (2z)^2 \times 2z$

7. $\dfrac{x+3x}{2x}$

8. $\dfrac{6x+4x}{5x-7x}$

9. $\dfrac{4y^2+5y^2}{8y-5y}$

10. $10x \div 2 + 4x$

11. $y + y \div y - y$

12. $\dfrac{y(y+y)}{2y^2+y^2}$

Simplifying Fractions

Simplify:

1. $\frac{24x}{3}$

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

3. $\frac{16}{12x^2}$

4. $\frac{y^9}{y^3}$

5. $\frac{8x^{10}}{x^8}$

6. $\frac{-6x^5y^8}{xy^{10}}$

7. $\frac{25z^8}{5z^4}$

8. $\frac{8x^6}{4x^{10}}$

9. $\frac{-9x^{10}y^5}{6x^8y^{10}}$

10. $\frac{\left(4x^3\right)^2}{2x^3}$

11. $\frac{\left(2xy^2\right)^3}{4xy^2}$

12. $\frac{4x^3y^3}{(2xy)^2}$

Algebraic Fractions

Simplify:

1. $\frac{5x}{9}+\frac{3x}{9}=$

2. $\frac{8x}{15}-\frac{6x}{15}=$

3. $\frac{3x}{y}+\frac{x}{y}=$

4. $\frac{x}{4}+\frac{x}{2}=$

5. $\frac{3x^2}{4}+\frac{2x^3}{5}=$

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

7. $\frac{4y}{5}\times\frac{2y}{3}=$

8. $\frac{2x}{5}\times\frac{3}{x^2}=$

9. $\frac{2x}{3}\times\frac{x}{5}=$

10. $\frac{x}{5}\div\frac{1}{3x}=$

11. $\frac{3x^4}{9}\div\frac{2x^2}{21}=$

12. $\frac{xy}{z}\div\frac{2}{z}=$

Expanding (1)

Expand these expressions:

1. $4(2x + y)$

2. $5(5x - 2)$

3. $y(y + 2)$

4. $x(2x + 5)$

5. $2y(3y - 8)$

6. $-3(x - 2)$

Expand and simplify these expressions:

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

8. $4x + 3(x + 5)$

9. $6(x - 2) + 2(2x - 1)$

10. $-2(y + 3) + 5(2y - 1)$

11. $5(x + 8) - 4(x - 5)$

12. $5(z - 1) - 2(z + 4)$

Expanding (2)

Expand these expressions:

1. $4(2x + y)$

2. $5(5x - 2)$

3. $y(y + 2)$

4. $x(2x + 5)$

5. $2y(3y - 8)$

6. $-3(x - 2)$

Expand and simplify these expressions:

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

8. $4x + 3(x + 5)$

9. $6(x - 2) + 2(2x - 1)$

10. $2(y + 3) - 5(2y - 1)$

11. $-5(x + 8) + 4(x + 5)$

12. $5(z + 1) - 2(z + 4)$

Expanding (3)

Expand these brackets:

1. $(x + 4)(x + 6)$

2. $(x + 4)(x – 5)$

3. $(y – 6)(y – 3)$

4. $(x – 2)(x + 15)$

5. $(2y + 5)(y + 2)$

6. $(4x – 5)(3x + 2)$

7. $(4y – 2)(3y – 5)$

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

9. $8 + 5x(x – 9)$

10. $(x + 6)^2$

11. $(2x + 5)^2$

12. $(5 – 2y)(5 + 2y)$

Factorising (1)

Factorise:

1. $5x + 5y$

2. $12x + 3y$

3. $20g - 10h$

4. $12s - 16t$

5. $30 - 16x$

6. $4xy^2 + 8xy$

7. $5g + gh$

8. $xy + 10y$

9. $3xy + 5y$

10. $3pq - q^2$

11. $8xy + 24x$

12. $3x^2y - x^3$

13. $2xy^2 + 4x^2y$

14. $6a^2b^2 + 3ab$

15. $12ab + 14$

Factorising (2)

Factorise:

1. $x^2 + 10x + 21$

2. $x^2 - 2x + 1$

3. $x^2 - x - 20$

4. $x^2 - 2x - 15$

5. $x^2 + 4x - 45$

6. $x^2 + 21x - 100$

7. $x^2 - 8x - 20$

8. $x^2 + 8x + 15$

9. $x^2 + 3x - 40$

10. $x^2 - 36$

11. $4x^2 - 16$

12. $x^2 + 14x + 49$

Harder Factorising

Factorise:

1. $x^2 - 21 = 4x$

2. $x^2 = 25x$

3. $x^2 - 300 = 20x$

4. $2x^2 + 14x + 12$

5. $2x^2 + 16x + 24$

6. $3x^2 + 15x + 18$

7. $3x^2 + 3x - 60$

8. $5x^2 - 5x - 30$

9. $x + 1 = \frac{12}{x}$

Solving Equations (1)

Solve for x:

1. $4x + 2 = 34$

2. $3x + 4 = 25$

3. $8y - 5 = 35$

4. $\frac{x}{7} = 5$

5. $\frac{x}{4} + 9 = 16$

6. $\frac{x+2}{3} = 7$

7. $\frac{2x-4}{2} = 8$

8. $2(x + 10) + 6 = 50$

9. $3x + 25 = 8x - 10$

10. $\frac{4x+6}{2} + 5 = 18$

11. $8x - 16 = 6x + 2$

12. $12 - x = 9x$

Solving Equations (2)

Solve these equations:

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

2. $-4(x + 5) = 16$

3. $5(x + 5) = 3(x - 4)$

4. $3(x - 3) - (x - 2) = 5$

5. $10(x + 3) - 4(x - 2) = 7(x + 5)$

6. $\frac{x^2}{3} = 48$

7. $\frac{120}{x} = 16$

8. $30 - \frac{x^2}{2} = 28$

Solving Equations (3)

Solve these equations:

1. $\frac{x+6}{3} = \frac{x+4}{5}$

2. $\frac{2x+1}{4} = \frac{x-7}{3}$

3. $\frac{x}{12} = \frac{3}{4}$

4. $\frac{x+1}{5} = 11$

5. $\frac{x}{4} + 12 = x$

6. $\frac{3x}{4} - \frac{x}{3} = 10$

7. $\frac{x}{3} + \frac{3x+11}{5} = 5$

8. $\frac{3x+4}{7} - \frac{x}{2} = 0$

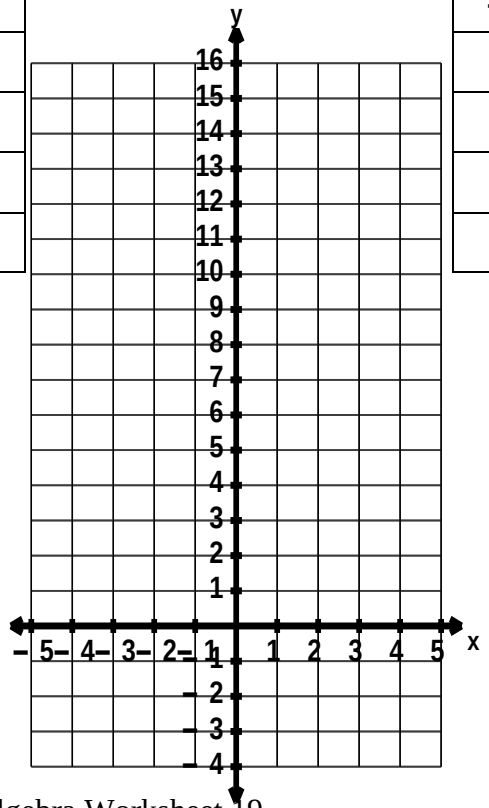
9. $\frac{6x-3}{4} - \frac{2x+1}{2} = 0$

Quadratic Graphs

Complete the tables and plot points:

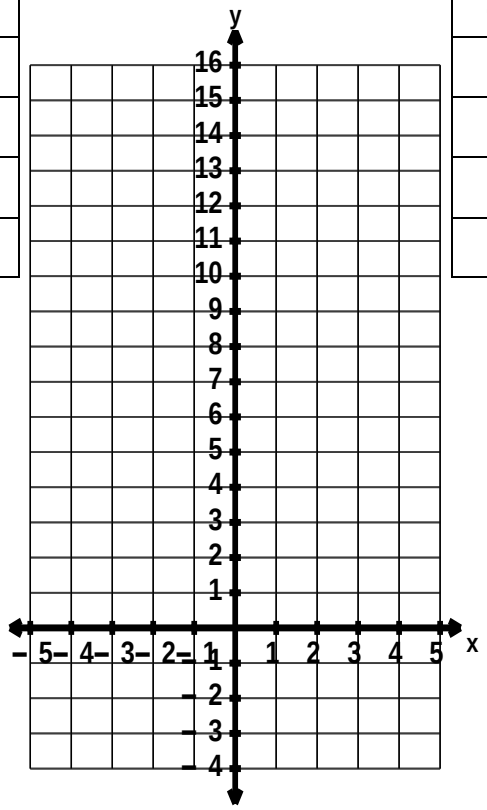
1. $y = x^2 - 3$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



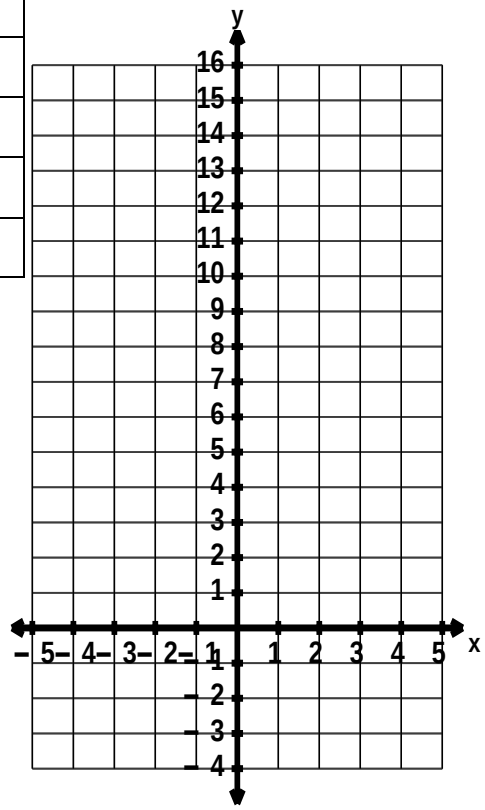
2. $y = x^2 + 2x$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



3. $y = (x - 1)(x + 1)$

x	y
-3	
-2	
-1	
0	
1	
2	
3	



Solving Quadratics

Solve:

1. $x^2 + 8x + 12 = 0$

2. $x^2 - 4x + 3 = 0$

3. $x^2 + 11x - 26 = 0$

4. $x^2 - 2x - 120 = 0$

5. $x^2 - 81 = 0$

6. $x^2 + 4x = 45$

7. $x^2 + 36 = 13x$

8. $x(x - 3) = 10$

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

10. $x^2 - 2x = 15$

11. $x^2 - 20 = x$

12. $x^2 = 11x$

Solving Quadratic Word Problems

1. A rectangular swimming pool has an area of $54m^2$.
The width of the pool is x metres and the difference between the length and the width is 3 metres.
What is the width of the pool.

2. A triangle has a base of $2x$ cm and a height of $(x + 1)$ cm. If the area of the triangle is 20 cm^2 calculate the value of x.

3. Kate is 10 years old, and James is 8 years old.
In how many years will the product of their ages be 143?

4. When a number, x, is squared, and then 15 is subtracted the result is 34.
What is the value of x.

5. Squaring a number, x, and then adding 2 times the original number gives a result of 24.
Write this problems as a quadratic equation then solve to find the value ot x.

Solving Exponents

Solve for x:

1. $x^3 = 216$

2. $x^4 = 81$

3. $x^5 = 1024$

4. $x^3 + 10 = 74$

5. $x^3 - 20 = 105$

6. $3x^6 = 192$

7. $6x^3 = 750$

8. $2x^4 + 512 = 1024$

9. $\frac{x^3}{4} = -54$

10. $2^x = 256$

11. $6^x = 1296$

12. $5^x + 75 = 200$

Simultaneous Equations

Solve for x and y:

1. $5x + 2y = 34$
$4x - 2y = 2$

2. $3x + 2y = 56$
$2x + 2y = 44$

3. $3x = y$
$x - y = -4$

4. $4x + 6y = 16$
$x + 2y = 5$

5. $3x + 2y = 26.5$
$x = y - 4.5$

6. $4x = y$
$100x - 10y = 315$

Simultaneous Equation Word Problems

1. Two farmers are buying livestock at the sales. Farmer Janis buys 6 calves and 5 lambs for $860. Farmer Fred buys 4 calves and 10 lambs for $1000. By writing this problem as a pair of simultaneous equations calculate the cost of the calves and lambs.

2. You spend $335 on 340 square tiles for your bathroom floor. You buy x small tiles at 80 cents each and y big tiles for $1.50 each. Form a pair of simultaneous equations and calculate the number of big and small titles that you purchased.

3. An equilateral triangle has sides $(6x - y)$ cm, $(5x + 5)$ cm and $(2x + 5y)$ cm long.
The perimeter of the triangle is 240 cm. Write down 2 equations connecting x and y and then solve to find the value of x and y.

Inequalities

Solve:

1. $8x < 24$

2. $y + 6 \geq 15$

3. $3x + 5 \leq 39$

4. $22 + x > 30$

5. $x - 5 \geq 24$

6. $4y + 2 \leq 2y + 11$

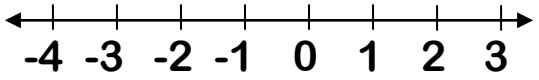
7. $-10x < 30$

8. $-5y \geq -25$

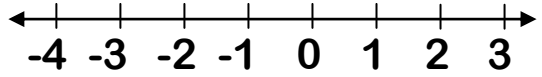
9. $32 - 4x \leq 40$

Mark the values on the number lines:

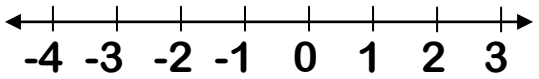
10. $-4 < x \leq 2$ **x** $\in$ R



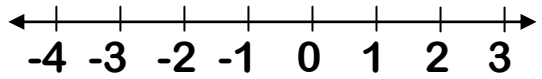
11. $-2 \leq x \leq 2$ **x** $\in$ R



12 $-3 < x < 2$ **x** $\in$ I



13. $-2 < x \leq 3$ **x** $\in$ I



Factorising and Fractions

Simplify:

1. $\dfrac{8(x+3)}{2}$

2. $\dfrac{x(6x-9)}{3x}$

3. $\dfrac{25x}{5x(x-5)}$

4. $\dfrac{(x+10)(x-2)}{(x-2)(x+5)}$

5. $\dfrac{6x^2+12x}{3x}$

6. $\dfrac{3x^3}{6x^2+9x}$

7. $\dfrac{8x^2+12x}{2x+3}$

8. $\dfrac{x^2+10x+24}{x^2+x-12}$

9. $\dfrac{4x+12}{x^2+8x+15}$

Rearranging Formulas

Rearrange the formulas to make the letter in brackets the new subject.

1. $x = \frac{3y}{10}$

(y)

2. $a = 10 - 5b$

(b)

3. $d = \frac{1}{2}(x + 10)$

(x)

4. $k = -2(3 - m)$

(m)

5. $x = \frac{2y}{3}$

(y)

6. $s = \frac{t^2}{6} + 20$

(t)

7. $x = 4y^2$

(y)

8. $y = x^2 - 10$

(x)

9. $q = \left(\frac{p}{2}\right)^2$

(p)

Algebra Revision I

Solve:

1. $\frac{4x+2}{5}=6$

2. $\frac{5x}{2}-7=3$

3. $\frac{2x}{3}=\frac{5}{2}$

4. $\frac{3x}{2}+4=16$

5. $2(x-1)=14$

6. $\frac{8x-2}{2}=11$

7. $\frac{5x}{6}=\frac{3}{4}$

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

9. $7(x+9)=147$

10. $\frac{2x+2}{5}=4$

11. $6x + 3 = 2x + 13$

12. $13x – 5 = x – 29$

13. $6x – 40 = 2x$

14. $3x + 8 = x + 1$

15. $10x + 30x = 100$

16. $2x + 12 = 5x – 3$

17. $3x – 8 = 4x – 7$

18. $15x – 23 = 10x + 18$

19. $7x – 5 = 5x + 45$

20. $4x – 20x = 36$

Solve

21. $4x(x - 5) = 0$

22. $2x(x + 8) = 0$

23. $(x + 2)(x - 2) = 0$

24. $(x - 6)(2x - 4) = 0$

25. $(x + 5)(5x - 4) = 0$

26. $(2x + 9)(x - 5) = 0$

27. $10x(x + 5) = 0$

28. $(x + 8)(4x + 1) = 0$

29. $(x + 7)(2x + 7) = 0$

30. $(2x + 1)(x - 2) = 0$

Expand

31. $(x + 8)(x + 9)$

32. $(x - 10)(x + 15)$

33. $(x + 7)(x - 3)$

34. $(x - 8)(x - 5)$

35. $(x + 6)(x - 6)$

36. $(x + 7)^2$

37. $(x - 10)^2$

38. $(2x + 5)(x + 2)$

39. $(3x + 1)(x - 7)$

40. $(2x - 9)(x + 4)$

Algebra Revision II

Simplify:

1. $\frac{9x^2}{15x}$

2. $\frac{12x^5}{4x^2}$

3. $\frac{6x}{2x^3}$

4. $\frac{18x^{12}}{15x^{20}}$

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

6. $12y^5 \times 2y^4$

7. $6x \times 6x \times 2x^2$

8. $3(x - 5) + 2(x - 2)$

9. $6(x - 4) + 2(2x + 1)$

10. $3x - 8(x + 1)$

Factorise

11. $x^2 + 3x - 28$

12. $x^2 + 10x + 16$

13. $x^2 - 6 - 40$

14. $x^2 - 20x + 75$

15. $x^2 + 16x + 64$

16. $x^2 - 4x + 4$

17. $2x^2 - 4x - 48$

18. $2x^2 + 22x + 56$

19. $x^2 - 20x - 125$

20. $x^2 + 100x + 2400$

If $x = 5$, $y = -2.5$ and $z = 4$ find:

21. $2x + 5$

22. $2x^2 + 4y$

23. $0.8(2x + 5z)$

24. $y^2 + z$

25. $\frac{xz}{y}$

26. $8xy + 4z$

27. $-2x + -2y + -2z$

28. $-6 \times (2x - 2y)^2$

29. $x(z^2 + 2y)$

30. $-6x + (-6yz)$

Find the rule for these patterns.

31.

x	1	2	3	4	5
y	7	9	11	13	15

32.

x	1	2	3	4	5
y	0	_	6	9	12

33.

x	1	2	3	4	5
y	_	-9	_	-19	-24

34.

x	1	2	3	4	5
y	3.5	_	5.5	_	7.5

35. Solve $5(x + 4) = 10$

36. Solve $4x + 2 = 2x + 1$

37. Factorise $3x^2 + 6x + 3$

38. Solve $\frac{20 - x}{4} > 7$

39. Simplify $\frac{(3x^2)^3}{9x}$

40. Solve $(x^2)^4 = 256$

Algebra Revision III

Expand and Simplify:

1. $3(x + 1) + 2(x – 4)$

2. $(3x – 1)(2x + 4)$

3. $(2x – 1) + (x – 4)$

4. $(x – 3)^2$

5. $2(x + 2) – 3(x – 4)$

6. $(5y + 2)(y + 4)$

Solve:

7. $x^2 – 7x + 6 = 0$

8. $5x^2 – 20x = 0$

9. $2x^2 – 4x – 16 = 0$

10. $4x^2 – 9 = 0$

11. $x^2 – 5x – 24 = 0$

12. $x^2 + 8x – 20 = 0$

Simplify:

13. $3x^4 \times 2x^3$

14. $\dfrac{x^2 + 5x + 6}{x + 2}$

15. $\dfrac{2y^2.y^3}{y^4}$

16. $\dfrac{9x^5}{12x^3}$

17. $(2x^2)^4$

18. $\dfrac{2x^2}{8x^5}$

19. $(x + 50)$ is a factor of:
$x^2 + 10x – 2000$
What is the other factor?

20. $5(x^2)^n \times 3x^4 = 15x^{12}$
What is the value of n?

21. Zeba is estimating the area and circumference of a circle by using $\pi = 3$. She uses the formulas $A = 3r^2$ and $C = 6r$.
What would the area and circumference of a circle be if the radius was 7.5 cm?

22. In a diving competition the judges calculate the score (S) by using the formula $S = 0.8DT$ where D is the degree of difficulty and T is the total of all the judges marks.
Alyssa does a dive with a difficulty degree of 2.5.
The total of the judges marks was 36.5
Calculate the score for Alyssa's dive.

23. Last December Levar's parents opened a savings account for his university study. They made an initial deposit (x) and have added $150 each month since. At the end of August there was $1775 in the account. Below is a diagram of the deposits.

$$\begin{array}{ccccccccccccc} \text{Dec} & \rightarrow & \text{Jan} & \rightarrow & \text{Feb} & \rightarrow & \text{Mar} & \rightarrow & \text{Apr} & \rightarrow & \text{May} & \rightarrow & \text{Jun} & \rightarrow & \text{July} & \rightarrow & \text{Aug} \\ x & \rightarrow & & {}^{+}150 & & \rightarrow & & {}^{+}150 & & \rightarrow & & {}^{+}150 & & \rightarrow & & {}^{+}150 & \end{array}$$

Write an expression for the amount of money that has been put into the account and use it to calculate the initial deposit (x).

Simplify:

24. $\dfrac{3x^2 - 15xy}{3x^2}$ **25.** $\dfrac{x}{3} + \dfrac{2x}{5}$ **26.** $\dfrac{2x}{3} + \dfrac{5x}{2}$

Answers

Worksheet 1
Practice Substitution

1. 12
2. 15
3. 17
4. 32
5. 6
6. 13
7. 21
8. 4
9. 9
10. 10
11. 6
12. 18
13. 29
14. -10
15. 9
16. 54
17. 130
18. 400
19. 15
20. 160

Worksheet 2
Substitution Word Problems

1. $11
2. $8.50
3. $17
4. $31
5. 2 fish, 1 chips
6. 4 fish, 2 chips
7. 1 fish, 2 chips
8. 6 very hungry

Worksheet 3
Practice More Substitution

1. 25
2. 2
3. 13
4. 12
5. 10
6. 7
7. -6
8. -21
9. 44
10. 58
11. -4
12. 1
13. 2
14. 5
15. 1
16. 3

Worksheet 4
Collecting Like Terms

1. $3x + 12y$
2. $7m^2 + n$
3. $12p^3 - 13q^2$
4. $9x^2 - 8x$
5. $16y + 20x$
6. $13a^2 - 5b$
7. $17xyz + 12xy + 4x$
8. $18pq + 6p$
9. $5x^2 - 4y^2$
10. $11ab + 5cd$
    Note $cd = dc$
11. $3x - 7y$
12. First sum = 3
    Second sum = 5
    Second larger by 2

Worksheet 5
Multiplying Algebraic Terms

1. $12x$
2. $-12xy$
3. $6xy$
4. $4y^2$
5. $4t^3$
6. x^{10}
7. $15m^5$
8. $12q^7$
9. $36x^4$
10. $-9c^2$
11. $8a^6$
12. 1

Dividing Algebraic Terms

1. $\frac{5x^3}{3}$
2. $\frac{4x^6}{3}$
3. $\frac{3}{2y^4}$
4. $\frac{1}{x^2y}$
5. $2xy^2$
6. $2x$
7. $3xy$
8. y^3
9. x

Worksheet 6
Brackets, Powers and Roots

1. x^6
2. y^8
3. $64a^4$
4. x^4y^{10}
5. $32x^{15}y^{10}$
6. $625a^8b^4$
7. $\frac{x^4}{y^6}$
8. $\frac{x^{12}}{y^8}$
9. $\frac{8}{x^6}$
10. 1
11. $\frac{1}{x^2}$
12. 1
13. 5
14. $2x$
15. $2x^2$
16. $4x^8$
17. $64x^7$
18. $3x^8$
19. $8x^{32}$
20. $4x^4$

Worksheet 7
Simplifying Fractions

1. $3y + y^2$
2. $10a^2$
3. $6x + 3$
4. $3y - 6y^2$
5. $10y + 8$
6. $2z + 8z^3$
7. 2
8. -5
9. $3y$
10. $9x$
11. 1
12. $\frac{2}{3}$

Worksheet 8
Simplifying Fractions

1. $8x$
2. $7.5y$,
3. $\frac{4}{3x^2}$
4. y^6
5. $8x^2$
6. $\frac{-6x^4}{y^2}$
7. $5z^4$
8. $\frac{2}{x^4}$
9. $\frac{-3x^2}{2y^5}$
10. $8x^3$
11. $2x^2y^4$
12. xy

Worksheet 9
Algebraic Fractions

1. $\frac{8x}{9}$
2. $\frac{2x}{15}$
3. $\frac{4x}{y}$
4. $\frac{3x}{4}$
5. $\frac{15x^2+8x^3}{20}$
6. $\frac{x-11}{12}$
7. $\frac{8y^2}{15}$
8. $\frac{6}{5x}$
9. $\frac{2x^2}{15}$
10. $\frac{3x^2}{5}$
11. $\frac{7x^2}{2}$ 12. $\frac{xy}{2}$

Worksheet 10
Expanding (1)

1. $8x + 4y$
2. $25x – 10$
3. $y^2 + 2y$
4. $2x^2 + 5x$
5. $6y^2 – 16y$
6. $-3x + 6$
7. $5x + 9$
8. $7x + 15$
9. $10x – 14$
10. $8y – 11$
11. $x + 60$
12. $3z – 13$

Worksheet 11
Expanding (2)

1. $8x + 4y$
2. $25x – 10$
3. $y^2 + 2y$
4. $2x^2 + 5x$
5. $6y^2 – 16y$
6. $-3x + 6$
7. $5x + 9$
8. $7x + 15$
9. $10x – 14$
10. $-8y + 11$
11. $-x – 20$
12. $3z – 3$

Worksheet 12
Expanding (3)

1. $x^2 + 10x + 24$
2. $x^2 – x – 20$
3. $x^2 – 9x + 18$
4. $x^2 + 13x – 30$
5. $2y^2 + 9y + 10$
6. $12x – 7x – 10$
7. $12y^2 – 26y + 10$
8. $2x^2 + 3xy + y^2$
9. $8 + 5x^2 – 45x$
10. $x^2 + 12x + 36$
11. $4x^2 + 20x + 25$
12. $25 – 4y^2$

Worksheet 13
Factorising (1)

1. $5(x + y)$
2. $3(4x + y)$
3. $10(2g – h)$
4. $4(3s – 4t)$
5. $2(15 – 8x)$
6. $4xy(y + 8)$
7. $g(5 + h)$
8. $y(x + 10)$
9. $y(3x + 5)$
10. $q(3p – q)$
11. $8x(y + 3)$
12. $x^2(3y – x)$
13. $2xy(y + 2x)$
14. $3ab(2ab + 1)$
15. $2(6ab + 7)$

Worksheet 14
Factorising (2)

1. $(x + 7)(x + 3)$
2. $(x – 1)^2$
3. $(x – 5)(x + 4)$
4. $(x – 5)(x + 3)$
5. $(x + 9)(x – 5)$
6. $(x + 25)(x – 4)$
7. $(x – 10)(x + 2)$
8. $(x + 5)(x + 3)$
9. $(x + 9)(x – 5)$
10. $(x + 6)(x – 6)$
11. $(2x – 4)(2x + 4)$
12. $(x + 7)^2$

Worksheet 15
Harder Factorising

1. $(x – 7)(x + 3)$
2. $x(x – 25)$
3. $(x – 30)(x + 10)$
4. $2(x + 6)(x + 1)$
5. $2(x + 6)(x + 2)$
6. $3(x + 3)(x + 2)$
7. $3(x + 5)(x – 4)$
8. $5(x – 3)(x + 2)$
9. $(x + 4)(x – 3)$

Worksheet 16
Solving Equations

1. $x = 8$
2. $x = 7$
3. $y = 5$
4. $x = 35$
5. $x = 28$
6. $x = 19$
7. $x = 10$
8. $x = 12$
9. $x = 7$
10. $x = 5$
11. $x = 9$
12. $x = 1.2$

Worksheet 17
Solving Equations (1)

1. $x = -8$
2. $x = -9$
3. $x = -18.5$
4. $x = 6$
5. $x = 3$
6. $x = 12$
7. $x = 7.5$
8. $x = \pm 2$

Worksheet 18
Solving Equations (2)

1. $x = -9$
2. $x = -15.5$
3. $x = 9$
4. $x = 54$
5. $x = 16$
6. $x = 24$
7. $x = 3$
8. $x = 8$
9. $x = 2.5$

Worksheet 19
Quadratic Graphs

1. $y = 6, 1, -2, -3, -2, 6$
2. $y = 3, 0, -1, 0, 3, 8, 15$
3. $y = 8, 3, 0, -1, 0, 3, 8$
   See your teacher and have them check your graphs for accuracy.

Worksheet 20
Solving Quadratics

1. $x = -6, -2$
2. $x = 3, 1$
3. $x = -13, 2$
4. $x = 12, -10$
5. $x = \pm 9$
6. $x = -9, 5$
7. $x = 9, 4$
8. $x = 5, -2$
9. $x = -5, 1$
10. $x = 5, -3$
11. $x = 5, -4$
12. $x = 0, 11$

Worksheet 21
Quadratic Word Problems

1. $x = 6$
2. $x = 4$
3. $x = 3$
4. $x = \pm 7$
5. $x = -6$ or $x = 4$

Worksheet 22
Solving Exponents

1. $x = 6$
2. $x = 3$
3. $x = 4$
4. $x = 4$
5. $x = 5$
6. $x = 2$
7. $x = 5$
8. $x = 4$
9. $x = -6$
10. $x = 8$
11. $x = 4$
12. $x = 3$

Worksheet 23
Simultaneous Equations

1. $x = 4, y = 7$
2. $x = 12, y = 10$
3. $x = 2, y = 6$
4. $x = 1, y = 2$
5. $x = 3.5, y = 8$
6. $x = 5.25, y = 21$

Worksheet 24
Word Problems

1. 90 calves, 64 lambs
2. Small (x) = 250
   Large (y) = 90
3. $y = 10, x = 15$

Worksheet 25, Inequalities

1. $x < 3$
2. $y \geq 9$
3. $x \leq 11.33$
4. $x > 8$
5. $x \geq 29$
6. $y \leq 4.5$
7. $x > -3$
8. $y \leq 5$
9. $x \geq -2$
10. Have your teacher check numbers 10 – 13.

Worksheet 26
Factorising and Fractions

1. $4x + 12$
2. $2x - 3$
3. $\frac{5}{x-5}$
4. $\frac{x+10}{x+5}$
5. $2x + 4$
6. $\frac{x^2}{2x+3}$
7. $4x$
8. $\frac{x+6}{x-3}$
9. $\frac{4}{x+5}$

Worksheet 27
Rearranging Formulas

1. $y = \frac{10x}{3}$
2. $b = \frac{10-a}{5}$
3. $x = 2d - 10$
4. $m = \frac{k+6}{2}$
5. $y = \frac{3x}{2}$
6. $t = \sqrt{16s-120}$
7. $y = \sqrt{\frac{x}{4}}$
8. $x = \sqrt{y+10}$
9. $p = 2\sqrt{q}$

Worksheet 28
Algebra Revision I

1. $x = 7$
2. $x = 4$
3. $x = 3.75$
4. $x = 8$
5. $x = 8$
6. $x = 3$
7. $x = 0.9$ (9/10)
8. $x = 2$
9. $x = 12$
10. $x = 9$
11. $x = 2.5$
12. $x = -2$
13. $x = 10$
14. $x = -3.5$
15. $x = 2.5$
16. $x = 5$
17. $x = -1$
18. $x = 8.2$
19. $x = 25$
20. $x = -2.25$

Worksheet 29

21. $x = 0, 5$
22. $x = 0, -8$
23. $x = \pm 2$
24. $x = 6, 2$
25. $x = -5, 4/5$
26. $x = -4.5, 5$
27. $x = 0, -5$
28. $x = -8, -0.25$
29. $x = -7, -3.5$
30. $x = -0.5, 2$
31. $x^2 + 17x + 72$
32. $x^2 + 5x - 150$
33. $x^2 + 4x - 21$
34. $x^2 - 13x + 40$
35. $x^2 - 36$
36. $x^2 + 14x + 49$
37. $x^2 - 20x + 100$
38. $2x^2 + 9x + 10$
39. $3x^2 - 20x - 7$
40. $2x^2 - x - 36$

Worksheet 30
Algebra Revision II

1. $\frac{3x}{5}$
2. $3x^3$
3. $\frac{3}{x^2}$
4. $\frac{6}{5x^8}$
5. $6x^5$
6. $24y^9$
7. $72x^4$
8. $5x - 19$
9. $10x - 22$
10. $-5x - 8$
11. $(x + 7)(x - 4)$
12. $(x + 8)(x + 2)$
13. $(x - 10)(x + 4)$
14. $(x - 15)(x - 5)$
15. $(x + 8)^2$
16. $(x - 2)^2$
17. $2(x - 6)(x + 4)$
18. $2(x + 7)(x + 4)$
19. $(x - 25)(x + 5)$
20. $(x + 60)(x + 40)$

Worksheet 31

21. 15
22. 40
23. 24
24. 10.25
25. -8
26. -84
27. -13
28. -1350
29. 55
30. 30
31. $2x + 5$
32. $3x - 3$
33. $-5x + 1$
34. $x + 2.5$
35. $x = -2$
36. $x = -0.5$
37. $(3x + 3)(x + 1)$
38. $x < -8$
39. $3x^5$
40. $x = 2$

Worksheet 32
Algebra Revision III

1. $5x - 5$
2. $6x^2 + 10x - 4$
3. $3x - 5$
4. $x^2 - 6x + 9$
5. $-x + 16$
6. $5y^2 + 22y + 8$
7. $x = 6, 1$
8. $x = 0, 4$
9. $x = 4, -2$
10. $x = \pm 3/2$
11. $x = 8, -3$
12. $x = -10, 2$
13. $6x^7$
14. $x + 3$
15. $2y$
16. $\frac{3x^2}{4}$
17. $16x^8$
18. $\frac{1}{4x^3}$
19. $(x - 40)$
20. $n = 4$

Worksheet 33

21. A = 168.75, C = 45
22. S = 73
23. x + 8 × 150 = 1775
    x = 575
24. (x – 5y)
25. $\frac{11x}{15}$
26. $\frac{19x}{6}$