MAHOBE

addition pyramids
number hunts
methods of multiplication
beautiful numbers
over the tens
adding in parts
number bonds
partitioning
the Fibonacci minute
division tips
24 challenge
four 4s
consecutive numbers

Mighty Maths

NUMERACY PROJECT

Kim Freeman

What is Mighty Maths?

Mighty Maths is a series of workbooks designed to support the Mathematics Curriculum. Each book is a culmination of many years teaching experience by the author. By using these books, students can practise and discover the mathematical concepts and principles that are essential for success in school mathematics. The following pages provide students with both reinforcement and extension to their normal school mathematics lessons. This allows them to maintain the skills that they already have and helps to overcome any weaknesses. The pages can also complement school lessons, helping the student to develop faster in mathematics, and give them a "head start" in class.

The Mighty Math series covers all the strands and relevant age group levels of Mathematics in the New Zealand Curriculum: Number, Measurement, Geometry, Algebra, and Statistics. Within these strands, students will get practice at: calculating, estimating and using measuring equipment. We are sure that the work will fit into any mathematics curriculum.

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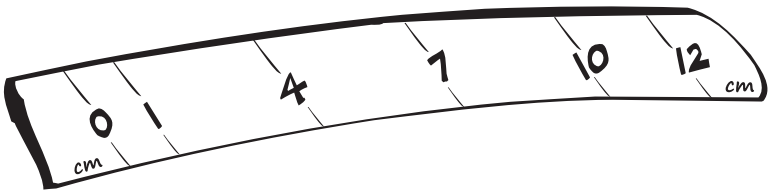

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The ruler shown is different to most. However you can still draw lines between 0 and 12 cm. Write how you would draw lines of these lengths.

2 cm Use the distance between 10 and 12 cm

3 cm .....

5 cm .....

6 cm .....

8 cm .....

9 cm .....

11 cm .....

---

6 + 18 + 2 + 4 = ...

5 + 21 + 9 + 15 = ...

9 + 8 + 5 + 2 + 5 = ...

14 + 18 + 6 + 12 + 8 + 2 = ...

13 + 18 + 10 + 7 + 2 = ...

14 + 16 + 17 + 3 = ...

27 + 35 + 13 + 15 = ...

32 + 65 + 68 + 35 + 50 = ...

92 + 46 + 20 + 54 + 8 = ...

Is there a quick way of adding these?

Find the totals of each of these Fibonacci Series.

2	1	4
3	5	8
5	6	12
8	11	20
13	17	32
21	28	52
34	45	84

MIGHTY MAGIC SQUARE

All the rows, columns and diagonals should add to the same number.

		6
		7
4		2

Magic Number = ...

Fill in the gaps.

6 + ... = 15 + 9

15 + ... = 4 × 15

8 × 4 = 23 + ...

100 ÷ 5 = 6 + ...

10 + ... = 2 × 15

12 + ... = 5 × 20

9 × 12 = 55 + ...

102 ÷ 2 = 30 + ...

1 + 2 + 3 + 4 = ...

7 + 8 + 9 + 10 = ...

3 + 4 + 5 + 6 = ...

5 + 6 + 7 + 8 = ...

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

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Complete these tables.

Add 3 to each.

n	3	5	7	8	12	14	27	36	42	58
n + 3										

Subtract 5 from each.

n	8	6	7	5	11	19	22	34	43	50
n – 5										

A quick way of multiplying by 4 is doubling then doubling again.

15 × 4 is the same as 15 × 2 × 2

15 × 2 = 30 »» and »» 30 × 2 = 60

therefore 15 × 4 = 60

Multiply each by 2 then 2 again.

n	9	13	17	28	15	14	21	26
2n								
4n								

Divide each by 3.

n	36	45	54	66	72	78	81	99
n ÷ 3								

Fill in the gaps.

18 + 2 = ... + 5

42 ÷ ..... = 9 – 3

40 + 10 = ... × 10

100 – 20 = 40 × .....

34 ..... 4 = 15 2

4 × ..... = 3 × 12

3 × 2 × ..... = 30

8 ..... 2 = 5 + 5

4 × ..... × 9 = 72

16 ..... 4 = 2 × 2

42 × 2 = ... × 7

5 × 6 = ... × 10

Find the pattern then complete the next 5 numbers.

4, 8, 12, ..., ..., ..., ..., ...

84, 77, 70, ..., ..., ..., ..., ...

1, 3, 6, 10, 15, ..., ..., ..., ..., ...

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step:	1	2	3	4
	1	1	1	1
	2	2	2	2
(1+2=3)»	3	3	3	
(2+3=5)»	5	5		
(3+5=8)»	8			

Time yourself for 1 minute with each of these starting numbers.

1 2

3 4

....

....

....

....

....

....

....

Very Good!

....

....

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....

....

....

Excellent!

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Amazing!

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What must be added to:

5 × 9 to make 50? .....

4 × 3 to make 20? .....

6 × 6 to make 40? .....

9 × 8 to make 90? .....

11 × 2 to make 30? .....

7 × 7 to make 60? .....

3 × 10 to make 100? .....

8 × 7 to make 70? .....

12 × 5 to make 80? .....

Find two numbers that:

Add to 9 and whose product is 20 .....

Add to 15 and whose product is 56 .....

Add to 16 and whose product is 48 .....

Add to 10 and whose product is 16 .....

Add to 11 and whose product is 24 .....

Write these numbers as words:

58 .....

220 .....

4 800 .....

51 000 .....

100 000 .....

What is the remainder when:

19 is divided by 5? .....

27 is divided by 8? .....

68 is divided by 11? .....

52 is divided by 3? .....

100 is divided by 8? .....

Halve these 5 times:

8 ....., ..., ..., ..., ...

80 ....., ..., ..., ..., ...

48 ....., ..., ..., ..., ...

112 ....., ..., ..., ..., ...

256 ....., ..., ..., ..., ...

320 ....., ..., ..., ..., ...

480 ....., ..., ..., ..., ...

3 200 ....., ..., ..., ..., ...

Double these numbers 7 times:

2	15	25
4	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

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This list contains all the products that you need to know.
Write each product.

2 × 2 = ...	5 × 8 = ...
2 × 3 = ...	5 × 9 = ...
2 × 4 = ...	5 × 10 = ...
2 × 5 = ...	5 × 11 = ...
2 × 6 = ...	5 × 12 = ...
2 × 7 = ...	6 × 6 = ...
2 × 8 = ...	6 × 7 = ...
2 × 9 = ...	6 × 8 = ...
2 × 10 = ...	6 × 9 = ...
2 × 11 = ...	6 × 10 = ...
2 × 12 = ...	6 × 11 = ...
3 × 3 = ...	6 × 12 = ...
3 × 4 = ...	7 × 7 = ...
3 × 5 = ...	7 × 8 = ...
3 × 6 = ...	7 × 9 = ...
3 × 7 = ...	7 × 10 = ...
3 × 8 = ...	7 × 11 = ...
3 × 9 = ...	7 × 12 = ...
3 × 10 = ...	8 × 8 = ...
3 × 11 = ...	8 × 9 = ...
3 × 12 = ...	8 × 10 = ...
4 × 4 = ...	8 × 11 = ...
4 × 5 = ...	8 × 12 = ...
4 × 6 = ...	9 × 9 = ...
4 × 7 = ...	9 × 10 = ...
4 × 8 = ...	9 × 11 = ...
4 × 9 = ...	9 × 12 = ...
4 × 10 = ...	10 × 10 = ...
4 × 11 = ...	10 × 11 = ...
4 × 12 = ...	10 × 12 = ...
5 × 5 = ...	11 × 11 = ...
5 × 6 = ...	11 × 12 = ...
5 × 7 = ...	12 × 12 = ...

Halve these numbers three times.

120 = ..., ..., ...
200 = ..., ..., ...
660 = ..., ..., ...
240 = ..., ..., ...
460 = ..., ..., ...
180 = ..., ..., ...
380 = ..., ..., ...
512 = ..., ..., ...

Multiplying by 5 is the same as multiplying by 10 and halving.

5 × 46 = ½ of 10 × 46
= ½ of 460
= 230

Multiply these numbers by 5.

5 × 24 = ...	80 × 5 = ...
5 × 18 = ...	66 × 5 = ...
5 × 32 = ...	48 × 5 = ...
5 × 68 = ...	92 × 5 = ...
5 × 74 = ...	28 × 5 = ...
5 × 14 = ...	50 × 5 = ...
5 × 86 = ...	15 × 5 = ...
5 × 71 = ...	87 × 5 = ...
5 × 23 = ...	55 × 5 = ...
5 × 99 = ...	69 × 5 = ...
5 × 83 = ...	47 × 5 = ...
5 × 37 = ...	16 × 5 = ...

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Fill in the missing sums.

+	7	9	3	12	4	8	5	14	6	10
4										
12										
2										
8										
6										
15										
5										
11										
13										
3										

Keep doubling each number in the column.

Calculate the totals of each column.

2	5
4	10
8	20
16	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

What must be added to:

2 × 3 to make 10? .....
4 × 3 to make 20? .....
12 × 2 to make 30? .....
3 × 12 to make 40? .....
8 × 6 to make 50? .....
7 × 8 to make 60? .....
9 × 7 to make 70? .....
6 × 12 to make 80? .....
10 × 8 to make 90? .....
9 × 9 to make 100? .....
12 × 9 to make 120? .....

What is the remainder when:

29 is divided by 2? .....
35 is divided by 3? .....
30 is divided by 4? .....
49 is divided by 5? .....
28 is divided by 6? .....
50 is divided by 7? .....
45 is divided by 8? .....
80 is divided by 9? .....
75 is divided by 10? .....
52 is divided by 11? .....
100 is divided by 12? .....

Fill in the spaces.

..... + 11 = 50
..... − 12 = 30
..... × 9 = 99
18 ÷ ..... = 6
20 + ... = 40
..... × 3 = 60
6 × 0 = ...
99 + 7 = ...
12 × ..... = 144
..... − 6 = 15
..... ÷ 7 = 8

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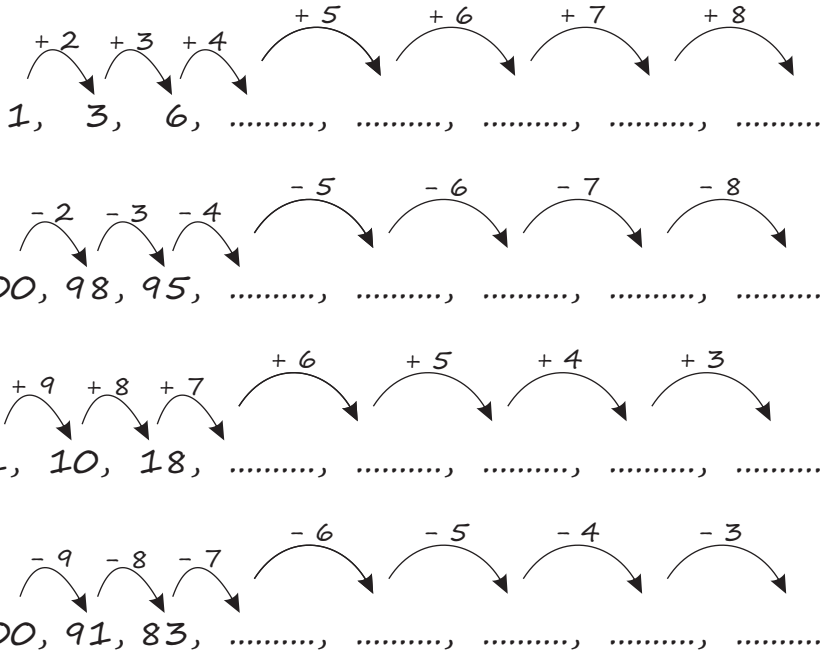
MIGHTY MATHS NUMERACY PROJECT



Complete this table:

n	n^2	$n^2 + 2$	n^3	$n^3 + 5$
1	$1^2 = 1$	3	$1^3 = 1$	6
2	$2^2 = 4$	6	$2^3 = 8$	13
3	.....	.....	$3^3 = 27$	32
4	.....	.....	.....	.....
5	.....	.....	.....	.....
6	.....	.....	.....	.....
7	.....	.....	.....	.....
8	.....	.....	.....	.....
9	.....	.....	.....	.....
10	.....	.....	.....	.....

58 + 13 is the same as 58 + 10 + 3 = 68 + 3 = 71

75 + 29 is the same as .....

67 + 15 is the same as .....

84 + 27 is the same as .....

49 + 19 is the same as .....

57 + 24 is the same as .....

76 + 35 is the same as .....

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step: 1	2	3	4
1	1	1	1
2	2	2	2
(1+2=3)» 3	3	3	
(2+3=5)» 5	5		
(3+5=8)» 8			

Time yourself for 1 minute with each of these starting numbers.

0 5

3 10

.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Very Good!	
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Excellent!	
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Amazing!	
.....	.....
.....	.....
.....	.....

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This list contains all the products that you need to know.

2 × 2 = ...	9 × 7 = ...
3 × 2 = ...	9 × 8 = ...
3 × 3 = ...	9 × 9 = ...
4 × 2 = ...	10 × 2 = ...
4 × 3 = ...	10 × 3 = ...
4 × 4 = ...	10 × 4 = ...
5 × 2 = ...	10 × 5 = ...
5 × 3 = ...	10 × 6 = ...
5 × 4 = ...	10 × 7 = ...
5 × 5 = ...	10 × 8 = ...
6 × 2 = ...	10 × 9 = ...
6 × 3 = ...	10 × 10 = ...
6 × 4 = ...	11 × 2 = ...
6 × 5 = ...	11 × 3 = ...
6 × 6 = ...	11 × 4 = ...
7 × 2 = ...	11 × 5 = ...
7 × 3 = ...	11 × 6 = ...
7 × 4 = ...	11 × 7 = ...
7 × 5 = ...	11 × 8 = ...
7 × 6 = ...	11 × 9 = ...
7 × 7 = ...	11 × 10 = ...
8 × 2 = ...	11 × 11 = ...
8 × 3 = ...	12 × 2 = ...
8 × 4 = ...	12 × 3 = ...
8 × 5 = ...	12 × 4 = ...
8 × 6 = ...	12 × 5 = ...
8 × 7 = ...	12 × 6 = ...
8 × 8 = ...	12 × 7 = ...
9 × 2 = ...	12 × 8 = ...
9 × 3 = ...	12 × 9 = ...
9 × 4 = ...	12 × 10 = ...
9 × 5 = ...	12 × 11 = ...
9 × 6 = ...	12 × 12 = ...

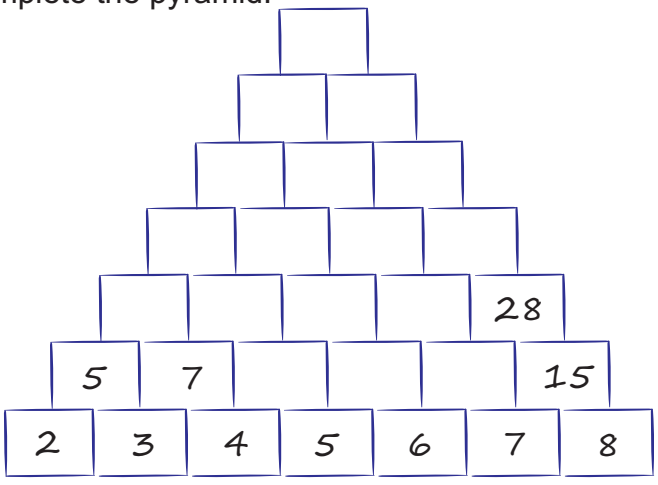
Keep doubling each number in the columns and then calculate the totals of each column.

1	3	7	9
2	6	14	.....
4	12	.....	.....
8	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Calculate the rest of the terms.

Term 1	$1 + 1^2$	=	2
Term 2	$2 + 2^2$	=	6
Term 3	$3 + 3^2$	=	12
Term 4	.....	=	.....
Term 5	.....	=	.....
Term 6	.....	=	.....
Term 7	.....	=	.....
Term 8	.....	=	.....
Term 9	.....	=	.....
Term 10	.....	=	.....

Complete the pyramid.



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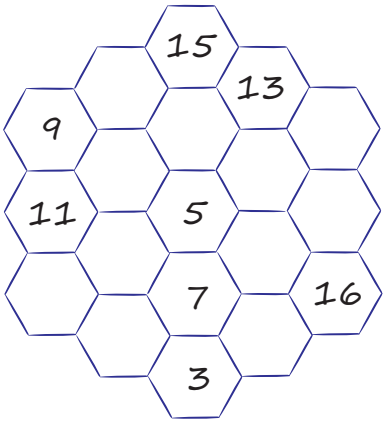
HONEY COMB MATHS

Place the numbers 1 - 19 in such a way that all the columns and all the diagonals sum to 38.



Write down all the combinations of 3 numbers that sum to 11.

..... + ... + ... = 11

..... + ... + ... = 11

..... + ... + ... = 11

..... + ... + ... = 11

..... + ... + ... = 11

..... + ... + ... = 11

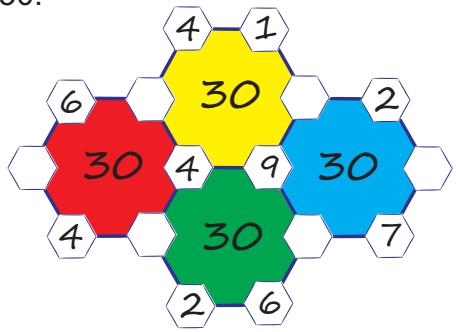
..... + ... + ... = 11

..... + ... + ... = 11

..... + ... + ... = 11

HONEY COMB MATH2

Use the numbers from 1 to 9. The six numbers around each large hexagon should add up to 30.



BECOME SUMBODY

1 + 2 + 3 + 4 = ...

3 + 4 + 5 + 6 = ...

5 + 6 + 7 + 8 = ...

7 + 8 + 9 + 10 = ...

..... + 3 = 20

18 + ... = 30

..... + 15 = 40

11 + ... = 50

16 + ... = 40

..... + 19 = 30

..... + 6 = 20

1 + 3 + 5 + 7 = ...

3 + 5 + 7 + 9 = ...

2 + 4 + 6 + 8 = ...

PARTITIONING

45 + 7 = 45 + 5 + 2

= 52

65 + 8 = ...

= .....

35 + 9 = ...

= .....

45 + 6 = ...

= .....

55 + 7 = ...

= .....

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step: 1	2	3	4
1	1	1	1
2	2	2	2
(1+2=3)» 3	3	3	
(2+3=5)» 5	5		
(3+5=8)» 8			

Time yourself for 1 minute with each of these starting numbers.

0	2
1	3

.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Very Good!	
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Excellent!	
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
Amazing!	
.....	.....
.....	.....
.....	.....
.....	.....

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Keep doubling each number in the column.

Calculate the totals of each column.

2	25	15	11	6
4	50	30	22	12
8	100	60	44	24
.....	.....	.....	.....	48
.....	.....	.....	.....	96
.....	.....	.....	.....	192
____	____	____	____	378

To find the sum of a total of doubled numbers,

double the last number,

$192 \times 2 = 384$

subtract the first number.

$384 - 6 = 378$

PARTITIONING

$14 + 27 = 10 + 20 + 4 + 7$

$= 30 + 11$

$= 41$

$34 + 19 =$ .....

= .....

= .....

$28 + 36 =$ .....

= .....

= .....

$43 + 27 =$ .....

= .....

= .....

$54 + 38 =$ .....

= .....

= .....

$56 + 29 =$ .....

= .....

= .....

NUMBER HUNT

Complete the tables.

+						3	
5	11				12		
7		12	16	11			
	8					5	
8		13					16
					11		
6							14

×	11			9			6
	33						
12		96	60				
				81			
							30
11					77		
8						24	

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Multiply by partitioning.

22 × 16

×	10	10	2
10	100	100	20
6	60	60	12

= 352

25 × 18

×	10	10	5
10			
8			

= .....

27 × 12

×	10	10	7
10			
2			

= .....

21 × 19

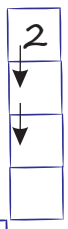
×	10	10	1
10			
9			

= .....

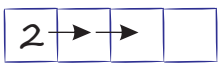
NUMBER TRAIL

Start at the S.
Try to reach F.

Landing on a 2 means:



or



S				
3	3	4	2	3
4	1	1	2	2
2	4	3	1	4
2	3	1	4	3
4	2	1	2	F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90

Calculate each answer then shade that number on the grid above.

1 × 1 = ...
2 + 1 = ...
2 + 2 = ...
12 - 6 = ...
6 + 1 = ...
8 + 2 = ...
22 - 11 = ...
12 + 4 = ...
13 + 6 = ...
7 + 7 + 7 = ...
30 - 7 = ...
5 × 5 = ...
9 + 9 + 9 = ...
15 + 15 = ...
15 + 19 = ...
18 + 19 = ...
28 + 11 = ...
35 + 8 = ...

13 + 34 = ...
24 + 26 = ...
37 + 14 = ...
44 + 8 = ...
39 + 14 = ...
42 + 12 = ...
70 - 15 = ...
85 - 27 = ...
90 - 30 = ...
100 - 36 = ...
86 - 16 = ...
92 - 19 = ...
83 - 6 = ...
9 × 9 = ...
55 + 27 = ...
47 + 36 = ...
55 + 29 = ...
69 + 19 = ...

THE TELEPHONE NUMBER

1. Use a calculator.
2. Key in the first 3 digits of your phone number.
3. Multiply by 80.
4. Add 1.
5. Multiply by 250.
6. Add the last 4 digits of your phone number.
7. Repeat the last step. (i.e. add the last 4 digits of your phone number again).
8. Subtract 250.
9. Divide by 2.
10. What is the answer?

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Below are all the multiplications that you need to know. Complete each product.

5 × 11 = ...	5 × 8 = ...
2 × 2 = ...	2 × 4 = ...
12 × 12 = ...	5 × 9 = ...
2 × 6 = ...	2 × 5 = ...
10 × 11 = ...	5 × 12 = ...
2 × 7 = ...	6 × 6 = ...
2 × 12 = ...	4 × 7 = ...
3 × 3 = ...	6 × 9 = ...
10 × 12 = ...	2 × 3 = ...
3 × 4 = ...	6 × 11 = ...
6 × 8 = ...	3 × 12 = ...
3 × 5 = ...	7 × 7 = ...
7 × 8 = ...	2 × 11 = ...
11 × 12 = ...	3 × 6 = ...
3 × 7 = ...	4 × 10 = ...
6 × 12 = ...	7 × 9 = ...
3 × 8 = ...	7 × 12 = ...
9 × 10 = ...	8 × 9 = ...
3 × 10 = ...	4 × 5 = ...
7 × 11 = ...	8 × 10 = ...
3 × 11 = ...	6 × 7 = ...
4 × 4 = ...	2 × 8 = ...
8 × 8 = ...	8 × 12 = ...
9 × 12 = ...	3 × 9 = ...
4 × 6 = ...	5 × 10 = ...
11 × 11 = ...	9 × 9 = ...
4 × 9 = ...	6 × 10 = ...
10 × 10 = ...	9 × 11 = ...
4 × 12 = ...	2 × 9 = ...
5 × 6 = ...	2 × 10 = ...
5 × 7 = ...	4 × 8 = ...
7 × 10 = ...	5 × 5 = ...
4 × 11 = ...	8 × 11 = ...

Division Tips - Dividing By Three

To calculate if you can divide a number evenly by three, add up all the digits. If THAT sum is divisible by three, then so is the original number.

e.g. 8787 8 + 7 + 8 + 7 = 30

30 is divisible by 3
so 8787 is too.

Are these numbers divisible evenly by 3?

1962	.....	Yes	No
29625	.....	Yes	No
8884	.....	Yes	No
6738	.....	Yes	No
13972	.....	Yes	No

Division Tips - Dividing By Six

If a number is BOTH divisible by three AND is an even number (ending in 0,2,4, 6 or 8) then it is divisible by six too.

e.g. 312 is an even number
add up all the digits = 6
6 is divisible by three.
Therefore 312 is divisible by six.

Are these numbers divisible evenly by 6?

7402	.....	Yes	No
5286	.....	Yes	No
4721	.....	Yes	No
2116	.....	Yes	No
64764	.....	Yes	No

Division Tips - Dividing By Nine

Use the same method as dividing by three - but divide the final answer by 9.

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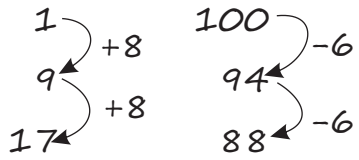

....

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....

....

....

....

....

....

....

....

JUST FOR FUN

Maths equations do not lie! Assign each letter of the alphabet a number from 1 to 26. Use A = 1, B = 2, C = 3, D = 4 etc.

Use these to calculate the sum totals of the following:

LUCK = ...

= .....%

HARDWORK = ...

= .....%

KNOWLEDGE = ...

= .....%

ATTITUDE = ...

= .....%

The Multiply by 11 Rule

23 × 11 = ... » **Step 1:** 23 × 11 = 2 (split the digits apart) 3 »» **Step 2:** 23 × 11 = 253 (2 + 3 = 5, add the digits)

54 × 11 = ... » **Step 1:** 54 × 11 = 5 4 »» **Step 2:** 54 × 11 = 594 (5 + 4 = 9)

76 × 11 = ... » **Step 1:** 76 × 11 = 7 6 »» **Step 2:** 76 × 11 = 836 (7 + 6 = 13)

Look at the examples above and then use this quick method to multiply these numbers by 11.

35 × 11 = ...
24 × 11 = ...
41 × 11 = ...
59 × 11 = ...
29 × 11 = ...
48 × 11 = ...

81 × 11 = ...
45 × 11 = ...
22 × 11 = ...
67 × 11 = ...
95 × 11 = ...
79 × 11 = ...

52 × 11 = ...
11 × 11 = ...
32 × 11 = ...
88 × 11 = ...
39 × 11 = ...
55 × 11 = ...

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Find 2 numbers whose:

sum is 13 and product is 36. $a + b = 13, a \times b = 36$ $a =$ ..... $b =$ .....

sum is 11 and product is 30. $a + b = 11, a \times b = 30$ $a =$ ..... $b =$ .....

sum is 52 and product is 100. $a + b = 52, a \times b = 100$ $a =$ ..... $b =$ .....

sum is 16 and product is 15. $a + b = 16, a \times b = 15$ $a =$ ..... $b =$ .....

sum is 18 and product is 72. $a + b = 18, a \times b = 72$ $a =$ ..... $b =$ .....

PARTITIONING

$28 + 25 = 20 + 20 + 8 + 5$
$= 40 + 13$
$= 53$

$37 + 18 =$ .....
$=$ .....
$=$ .....

$22 + 39 =$ .....
$=$ .....
$=$ .....

$45 + 27 =$ .....
$=$ .....
$=$ .....

$26 + 16 =$ .....
$=$ .....
$=$ .....

$49 + 38 =$ .....
$=$ .....
$=$ .....

NUMBER BONDS

..... + 8 = 10
..... + 5 = 10
3 + ... = 10
..... + 4 = 10
..... + 13 = 20
17 + ... = 20
..... + 11 = 20
..... + 15 = 20
8 + ... = 20
18 + ... = 20
10 + ... = 20
..... + 2 = 20
..... + 11 = 20
25 + ... = 30
..... + 15 = 30
7 + ... = 30
19 + ... = 30
..... + 8 = 30
..... + 12 = 30
5 + ... = 30

..... + 6 = 40
18 + ... = 40
..... + 5 = 40
..... + 19 = 40
27 + ... = 40
..... + 21 = 40
..... + 14 = 40
9 + ... = 40
38 + ... = 50
20 + ... = 50
..... + 16 = 50
..... + 31 = 50
25 + ... = 50
..... + 14 = 50
18 + ... = 50
29 + ... = 50
..... + 26 = 50
..... + 32 = 50
15 + ... = 50
..... + 32 = 50

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Complete these multiplication tables.

×	10	10	6
10	100	100	60
4	40	40	24

26 × 14 = ...

×	10	10	5
10			
2			

25 × 12 = ...

×	10	10	3
10			
3			

23 × 13 = ...

×	10	10	9
10			
3			

29 × 13 = ...

×	10	10	4
10			
5			

24 × 15 = ...

Two Mighty Additions

987654321	123456789
087654321	123456780
007654321	123456700
000654321	123456000
000054321	123450000
000004321	123400000
000000321	123000000
000000021	120000000
+ 000000001	+ 100000000

11 × 7 = ...	11 × 9 = ...	10 × 2 = ...
9 × 4 = ...	6 × 4 = ...	4 × 3 = ...
6 × 2 = ...	10 × 10 = ...	10 × 3 = ...
9 × 9 = ...	8 × 7 = ...	3 × 2 = ...
12 × 11 = ...	6 × 6 = ...	10 × 6 = ...
5 × 3 = ...	11 × 5 = ...	7 × 6 = ...
10 × 7 = ...	7 × 3 = ...	12 × 7 = ...
7 × 5 = ...	10 × 9 = ...	11 × 2 = ...
10 × 4 = ...	7 × 7 = ...	8 × 4 = ...
5 × 2 = ...	11 × 11 = ...	11 × 3 = ...
12 × 12 = ...	8 × 2 = ...	7 × 2 = ...
8 × 6 = ...	12 × 8 = ...	11 × 4 = ...
11 × 10 = ...	8 × 3 = ...	6 × 3 = ...
9 × 2 = ...	11 × 6 = ...	3 × 3 = ...
5 × 4 = ...	8 × 5 = ...	12 × 2 = ...
12 × 4 = ...	12 × 9 = ...	7 × 4 = ...
2 × 2 = ...	9 × 3 = ...	10 × 5 = ...
4 × 4 = ...	4 × 2 = ...	8 × 8 = ...
12 × 3 = ...	12 × 10 = ...	12 × 5 = ...
9 × 6 = ...	9 × 5 = ...	9 × 8 = ...
10 × 8 = ...	12 × 6 = ...	6 × 5 = ...
5 × 5 = ...	9 × 7 = ...	11 × 8 = ...

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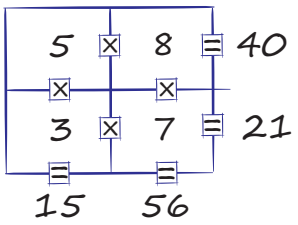
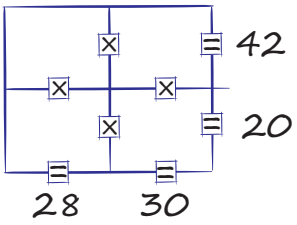
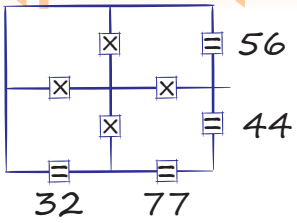
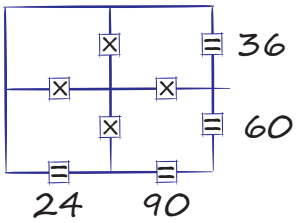
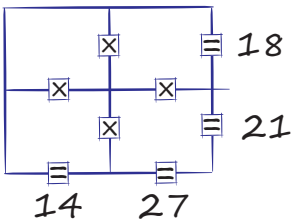
Complete these multiplication squares. The first is done for you.

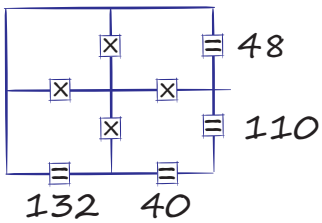












The Multiply by 11 Rule E X P A N D E D

41362 × 11 = ...

Step 1: Write down the number with a zero digit in front.
Step 2: Write down the units digit (the first digit).
Step 3+: Add each of the digit's neighbours on the left.

= 041362
= 2
= 82
= 982
= 4982
= 54982
= 454982

Multiply these numbers:

51236 × 11 = ...

41813 × 11= .....

53171 × 11= .....

45362 × 11= .....

12709 × 11= .....

OVER THE TENS

28 + ... = 36
57 + ... = 63
31 + ... = 45
45 + ... = 54
98 + ... = 103
81 + ... = 97
97 + ... = 124
99 + ... = 131
86 + ... = 116

ADDING IN PARTS

46 + 8 » 50 + 4 = 54
76 + 5 » .....
58 + 4 » .....
67 + 9 » .....
77 + 7 » .....
35 + 9 » .....
88 + 6 » .....
29 + 3 » .....
55 + 5 » .....

MORE OVER THE TENS

58 + ... = 95
36 + ... = 64
19 + ... = 42
58 + ... = 94
27 + ... = 75
35 + ... = 63
69 + ... = 96
38 + ... = 81
42 + ... = 55

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How to multiply up to 20 x 20 in your head.

Take two 2 digit numbers: e.g. 15 x 13

Take the first number and add the units digit of the second number. 15 + 3 = 18

Multiply this by 10 18 x 10 = 180

Multiply the units digits of both numbers and add to your last answer. 5 x 3 = 15

180 + 15 = 195

Therefore 15 x 13 = 195

Trying it again

14 x 18

14 + 8 = 22

220

4 x 8 = 32

220 + 32 = 252

Therefore 14 x 18 = 252

Use the method shown to quickly multiply these numbers.

12 × 16

13 × 19

17 × 18

14 × 11

15 × 17

19 × 16

18 × 12

11 × 15

13 × 14

20 × 20

Find the remainders when:

18 is divided by 5 .....

69 is divided by 11 .....

40 is divided by 7 .....

42 is divided by 4 .....

100 is divided by 8 .....

59 is divided by 3 .....

What must be added to:

9 × 7 to make 80 .....

4 × 3 to make 30 .....

5 × 9 to make 60 .....

6 × 8 to make 70 .....

7 × 4 to make 40 .....

8 × 2 to make 50 .....

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Fill in the gaps.

$8 \times 7 =$	$30 + 9 =$	$24 - 6 =$	$3 \times 13 =$ .....
$100 \div 5 =$	$6 \times 4 =$	$8 + 7 =$	$35 \div 7 =$ .....
$5 \times 0 =$	$99 + 8 =$	$20 \times 3 =$	$11^2 =$ .....
$30 \times 9 =$	$81 \div 9 =$	$32 \times 3 =$	$15 \times 5 =$ .....
$2^3 =$	$2^3 \times 2^3 =$	$4^2 \times 2^2 =$	$2 \times 5^2 =$ .....
$89 + 99 =$	$10^2 - 9^2 =$	$5^2 \times 2 \times 4 =$	$8^2 - 4^3 =$ .....
$21 + 23 =$	$23 + 25 =$	$25 + 27 =$	$27 + 29 =$ .....
$95 - 23 =$	$95 - 25 =$	$95 - 27 =$	$95 - 29 =$ .....

Some Beautiful Numbers

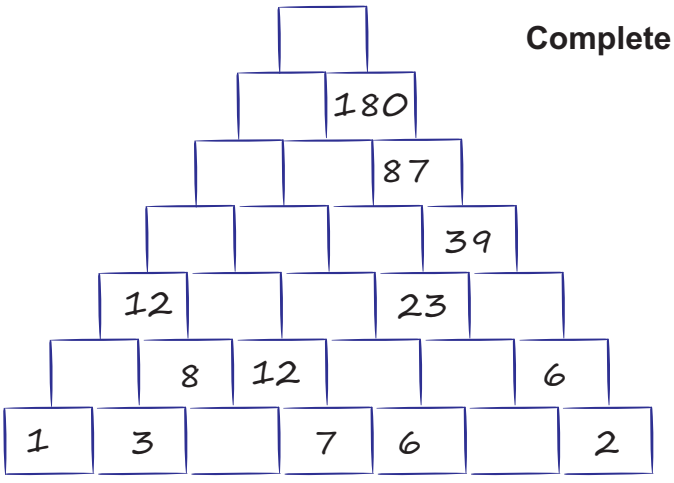
$1^1 + 3^2 + 5^3$	$1^1 + 7^2 + 5^3$	$5^{-1} + 1^2 + 8^3$
$= 1 + 9 + 125$	=	= .....
=	=	= .....

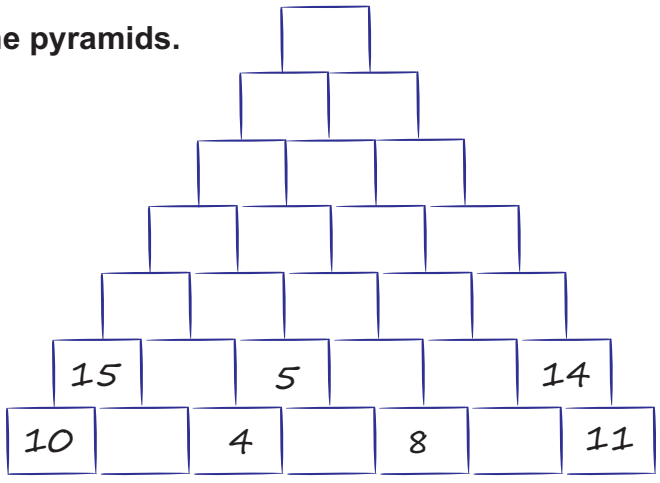
$9 \times 9 =$	$3 \times 24 =$	$2 \times 47 =$	$2 \times 497 =$ .....
$9 + 9 =$	$3 + 24 =$	$2 + 47 =$	$2 + 497 =$ .....

$12^2 =$	$13^2 =$	$3^2 + 4^2 =$ .....
$21^2 =$	$31^2 =$	$5^2 =$ .....

$10^2 + 11^2 + 12^2$	$13^2 + 14^2$	$2^7 - 1$
=	=	= .....
=	=	= .....

Complete the pyramids.





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Find the totals of these 6 and 10 number Fibonacci Series.

6	3	5	4
4	7	10	7
10	10	15	11
14	17	25	18
24	27	40	29
38	44	65	47
62	71	105	76
100	115	170	123
162	186	275	199
262	301	445	322
			836

11 × 76

2	1	4	1
3	5	8	2
5	6	12	3
8	11	20	5
13	17	32	8
21	28	52	13
			32

4 × 8

Fibonacci Totals - A Quick Way - Check your answers.

Find the total of a 10 number Fibonacci by:

multiplying the 7th number in the series by 11.

Find the total of a 6 number Fibonacci by:

multiplying the 5th number in the series by 4.

MAGIC SQUARES

Rows, columns and diagonals add to the same number.

2	7	6
	5	

13		
	10	11
		7

		15
		16
13		11

HOW FOUR CAN YOU GO?

Use only four fours

{4, 4, 4, 4}

and +, −, ×, ÷, $\sqrt{\ }$ or !

Note: $4! = 4\times3\times2\times1$

$\sqrt{4} = 2$

1 = 4 ÷ 4 + 4 − 4

2 = ...

3 = ...

4 = ...

5 = ...

6 = ...

7 = ...

8 = ...

9 = ...

10 = ...

11 = ...

12 = ...

13 = ...

14 = ...

15 = ...

16 = ...

17 = ...

18 = ...

19 = ...

20 = ...

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The Russian Peasant Method of Multiplication

Put the numbers in two columns.
Double each consecutive number in column 1.
Halve each consecutive number in column 2 (ignore remainders).
Add all the numbers in column 1 that are opposite odd numbers in column 2.

e.g. 15 × 26

~~15~~	26
30	13
~~60~~	6
120	3
240	1
390	

24 × 24

24	24

31 × 69

31	69

117 × 54

Squaring Numbers ending in 5

e.g. 25^2

Multiply the tens digit by 1 greater.

$2 \times 3 = 6$

Tack on a 25 $= 625$

Square these numbers.

15^2 = ...
25^2 = ...
35^2 = ...
45^2 = ...
55^2 = ...
65^2 = ...
75^2 = ...
85^2 = ...
95^2 = ...
105^2 = ...
115^2 = ...
125^2 = ...

Complete the series.

3 +6 → 9 +6 → 15

.....
.....
.....
.....
.....
.....
.....

102 → ..... (−4) → ..... (−4)

.....
.....
.....
.....

Squaring Numbers in the 50s

e.g. 52^2

Add the ones digit to 25

$2 + 25 = 27$

Square the ones digit and tack it on to the end.

$2^2 = 04$

$= 2704$

Square these numbers.

50^2 = ...
51^2 = ...
52^2 = ...
53^2 = ...
54^2 = ...
55^2 = ...
56^2 = ...
57^2 = ...
58^2 = ...
59^2 = ...

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Halve these numbers three times.

360 = ..., ..., ...

120 = ..., ..., ...

440 = ..., ..., ...

280 = ..., ..., ...

560 = ..., ..., ...

240 = ..., ..., ...

980 = ..., ..., ...

404 = ..., ..., ...

612 = ..., ..., ...

Multiplying by 5 is the same as multiplying by 10 and halving.

5 × 62 = ½ of 10 × 62

= ½ of 620

= 310

Multiply these numbers by 5.

5 × 28 = ... 43 × 5 = ...

5 × 51 = ... 19 × 5 = ...

5 × 46 = ... 94 × 5 = ...

5 × 77 = ... 22 × 5 = ...

5 × 32 = ... 47 × 5 = ...

5 × 81 = ... 74 × 5 = ...

5 × 53 = ... 33 × 5 = ...

5 × 66 = ... 35 × 5 = ...

5 × 30 = ... 14 × 5 = ...

5 × 99 = ... 41 × 5 = ...

5 × 75 = ... 67 × 5 = ...

DIVISION SET 1

4 ÷ 2 = ... 18 ÷ 6 = ...

66 ÷ 11 = ... 42 ÷ 7 = ...

144 ÷ 12 = ... 120 ÷ 12 = ...

6 ÷ 3 = ... 21 ÷ 7 = ...

55 ÷ 11 = ... 24 ÷ 8 = ...

40 ÷ 8 = ... 27 ÷ 9 = ...

8 ÷ 4 = ... 96 ÷ 12 = ...

54 ÷ 9 = ... 30 ÷ 10 = ...

10 ÷ 5 = ... 16 ÷ 8 = ...

60 ÷ 10 = ... 80 ÷ 10 = ...

90 ÷ 10 = ... 33 ÷ 11 = ...

14 ÷ 7 = ... 84 ÷ 12 = ...

132 ÷ 12 = ... 70 ÷ 10 = ...

48 ÷ 8 = ... 12 ÷ 6 = ...

56 ÷ 8 = ... 36 ÷ 12 = ...

18 ÷ 9 = ... 16 ÷ 4 = ...

88 ÷ 11 = ... 64 ÷ 8 = ...

110 ÷ 11 = ... 20 ÷ 5 = ...

24 ÷ 12 = ... 20 ÷ 10 = ...

63 ÷ 9 = ... 24 ÷ 6 = ...

77 ÷ 11 = ... 22 ÷ 11 = ...

81 ÷ 9 = ... 28 ÷ 7 = ...

121 ÷ 11 = ... 32 ÷ 8 = ...

9 ÷ 3 = ... 36 ÷ 9 = ...

72 ÷ 9 = ... 100 ÷ 10 = ...

72 ÷ 12 = ... 40 ÷ 10 = ...

12 ÷ 4 = ... 44 ÷ 11 = ...

60 ÷ 12 = ... 96 ÷ 12 = ...

15 ÷ 5 = ... 48 ÷ 12 = ...

45 ÷ 9 = ... 25 ÷ 5 = ...

36 ÷ 6 = ... 30 ÷ 6 = ...

50 ÷ 10 = ... 99 ÷ 11 = ...

49 ÷ 7 = ... 35 ÷ 7 = ...

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Increase these numbers by $n^2 + 1$

n	$n^2 + 1$
5	25 + 1 = 26
6	.....
7	.....
8	.....
9	.....
10	.....
15	.....
20	.....

Increase these numbers by $n^2 - 2$

n	$n^2 - 2$
5	25 - 2 = 23
6	.....
7	.....
8	.....
9	.....
10	.....
15	.....
20	.....

Increase these numbers by 2n + 8

n	2n + 8
5	10 + 8 = 18
6	.....
7	.....
8	.....
9	.....
10	.....
15	.....
20	.....

BEMA

$(12 + 3) \times 2$ » 15 × 2 = 30

$5 + 4 \times 6$ » .....

$6 + 3 \times 2 + 7$ » .....

$36 - (8 - 6) \times 5$ » .....

$18 \div 6 + 5 \times 4$ » .....

$6 \times (10 - 2)$ » .....

$5^2 \times 4 - 10$ » .....

$55 - (10 \times 2^2)$ » .....

$[3 \times (4 + 6)] \times 2$ » .....

$(5 - 2)^3 - 9$ » .....

$(33 + 7) \div (10 \div 5)$ » .....

Division Tips - Dividing By Seven

To calculate if a number is divisible by seven, take the last digit, double it, and subtract it from the rest of the number. If THAT number is divisible by seven then so is the original number.

e.g. 231 1 × 2 = 2

23 - 2 = 21

21 is divisible by 7

so 231 is too.

Are these numbers divisible evenly by 7?

228	.....	Yes	No
175	.....	Yes	No
413	.....	Yes	No
607	.....	Yes	No
644	.....	Yes	No
757	.....	Yes	No
847	.....	Yes	No

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Rewrite the equations and calculate the answers.

$(8 \times 12) - (7 \times 12)$ » .....

$(4 + 6) \times (8 + 12)$ » .....

$(6 \times 9) + (3 \times 9)$ » .....

$8^2 - 5^2$ » .....

$3^3 + 9^2$ » .....

$2 \times (5 + 2)^2$ » .....

$(8 - 6)^3 \div (10 - 2^3)$ » .....

$[40 \div (3 + 2)]^2$ » .....

Replace the ..... with +, -, ÷ or ×

$3 + 15 \ldots\ldots 3 = 8$

$10 \ldots\ldots 7 + 15 = 18$

$8 \ldots\ldots 4 - 10 = 22$

$(18 \ldots\ldots 2) \div 10 = 2$

$(10 \ldots\ldots 3) \ldots\ldots 7 = 1$

$15 \ldots\ldots 3 + 2 \ldots\ldots 5 = 15$

$(18 \ldots\ldots 6) \times 3 \ldots\ldots 2 = 38$

$32 \ldots\ldots (8 \ldots\ldots 2) = 8$

DIVISION TIPS - Dividing by ninety one

$62 \div 91$ or $\frac{62}{91}$

1. Take the numerator (62) and add the tens unit to it:
   $62 + 6 = 68$
2. Put a decimal point in front.
   $= 0.68$
3. Take the units digit of the numerator, subtract 1 and tack that on to the number you have so far:
   $= 0.681$
4. How far is the first digit (6) from 9?
   Tack the answer on the end.
   $= 0.6813$
5. How far is the second digit (8) from 9?
   Tack the answer on the end.
   $= 0.68131$
6. How far is the third digit (1) from 9?
   Tack the answer on the end.
   $= 0.681318$
7. Keep on doing this process until you have your answer to the required decimal points.

Divide these numbers by 91.

$35 \div 91$

= .....

$22 \div 91$

= .....

$19 \div 91$

= .....

$47 \div 91$

= .....

$54 \div 91$

= .....

$88 \div 91$

= .....

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Complete the tables

n	3n − 6
5	15 − 6 = 9
6	
7	
8	
9	
10	
15	
20	

n	10n + 15
5	50 + 15 = 65
6	
7	
8	
9	
10	
15	
20	

n	$2n^2$
5	2 × 25 = 50
6	
7	
8	
9	
10	
15	
20	

24 CHALLENGE

Write in brackets, +, -, ×, or ÷ to make 24.

7 3 3 6 »»» (3 + 7) × 3 − 6 = 24

1 2 3 4 »»» ..... = 24

13 5 8 2 »»» ..... = 24

2 7 8 2 »»» ..... = 24

4 2 3 4 »»» ..... = 24

9 4 5 1 »»» ..... = 24

10 12 6 1 »»» ..... = 24

11 5 9 1 »»» ..... = 24

1 13 10 6 »»» ..... = 24

11 9 9 2 »»» ..... = 24

10 11 6 2 »»» ..... = 24

DICE ARITHMETIC

Get into groups of 2 or 3. Take turns to throw 3 dice. Make up a sum using the 3 numbers and +, -, ×, ÷, √ or !

Fill in your sum below.

$\sqrt{(5 - 1)} + 2 = 4$

$2^2 + 3 = 7$

If you cannot use the numbers on the dice then the first of the other players to come up with a sum gets to put that sum onto their own paper.

The first to have all 10 numbers wins.

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

7 .....

8 .....

9 .....

10 .....

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CALLING CODE

Using the phone keypad below figure out the names of the following people.

G E
4 3/2 6/3 7/3 4 3/2

= .....

9 4/3 5/3 5/3 7 6/3 9 3/2 7/3

= .....

7/3 6/3 7/4 3/2 2/2 8/2 7/4 4/2

= .....

9 2 7/3 7/3 3/2 6/2 = ...

7 3/2 2 2/3 3/2 = ...

SUBTRACTIONS

..... - 21 = 39	..... - 48 = 36
..... - 31 = 37	..... - 50 = 13
..... - 50 = 15	..... - 42 = 24
..... - 23 = 34	..... - 21 = 77
..... - 19 = 22	..... - 64 = 18
..... - 16 = 57	..... - 26 = 25
..... - 69 = 46	..... - 27 = 44
..... - 12 = 71	..... - 38 = 62

DIVISION SET 2

4 ÷ 2 = ...	55 ÷ 5 = ...
48 ÷ 4 = ...	63 ÷ 7 = ...
81 ÷ 9 = ...	120 ÷ 10 = ...
9 ÷ 3 = ...	6 ÷ 2 = ...
40 ÷ 4 = ...	33 ÷ 3 = ...
12 ÷ 3 = ...	72 ÷ 8 = ...
45 ÷ 5 = ...	20 ÷ 2 = ...
60 ÷ 6 = ...	8 ÷ 2 = ...
10 ÷ 2 = ...	30 ÷ 3 = ...
70 ÷ 7 = ...	16 ÷ 4 = ...
20 ÷ 4 = ...	12 ÷ 2 = ...
25 ÷ 5 = ...	80 ÷ 8 = ...
77 ÷ 7 = ...	15 ÷ 3 = ...
18 ÷ 3 = ...	100 ÷ 10 = ...
24 ÷ 4 = ...	22 ÷ 2 = ...
30 ÷ 5 = ...	60 ÷ 5 = ...
90 ÷ 9 = ...	66 ÷ 6 = ...
36 ÷ 6 = ...	50 ÷ 5 = ...
14 ÷ 2 = ...	24 ÷ 3 = ...
21 ÷ 3 = ...	88 ÷ 8 = ...
28 ÷ 4 = ...	24 ÷ 2 = ...
44 ÷ 4 = ...	99 ÷ 9 = ...
35 ÷ 5 = ...	110 ÷ 10 = ...
16 ÷ 2 = ...	121 ÷ 11 = ...
96 ÷ 8 = ...	36 ÷ 3 = ...
56 ÷ 7 = ...	27 ÷ 3 = ...
84 ÷ 7 = ...	72 ÷ 6 = ...
40 ÷ 5 = ...	48 ÷ 6 = ...
49 ÷ 7 = ...	108 ÷ 9 = ...
64 ÷ 8 = ...	42 ÷ 6 = ...
18 ÷ 2 = ...	132 ÷ 11 = ...
32 ÷ 4 = ...	144 ÷ 12 = ...
54 ÷ 6 = ...	36 ÷ 4 = ...

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DIVISION TIPS - Dividing by one hundred and forty three

e.g. 7 divided by 143 $\frac{7}{143}$

1. Multiply the numerator by 7 and subtract 1.
   7 x 7 = 49
   49 - 1 = 48
2. If it is a two digit number put a zero and a decimal point infront.
   = 0.048
3. How far is the first digit (0) from 9?
   Tack the answer on the end.
   = 0.0489
4. How far is the second digit (4) from 9?
   Tack that answer on the end.
   = 0.04895
5. How far is the third digit (8) from 9?
   Tack the answer on the end.
   = 0.048951
6. Keep on doing this process until you have your answer to the required decimal points

Divide these numbers by 143.

29 ÷ 143
= .....

48 ÷ 143
= .....

55 ÷ 143
= .....

77 ÷ 143
= .....

92 ÷ 143
= .....

TABLE MULTIPLICATION

Break up the numbers into easier multiplications then add.

x	10	10	8
10	100	100	80
7	70	70	56

28 x 17 = 280 + 196
= 476

x	10	10	6
10			
2			

26 x 12 = ...
= .....

x	10	10	7
10			
10			
4			

27 x 24
= .....

x	10	10	5
10			
10			
2			

25 x 22
= .....

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Circle the bigger fraction of each pair.

$\frac{10}{12}$ $\frac{1}{3}$ $\frac{5}{8}$ $\frac{8}{12}$ $\frac{7}{8}$ $\frac{3}{4}$

$\frac{1}{2}$ $\frac{1}{12}$ $\frac{5}{8}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{2}{3}$

Write these fractions in order from smallest to largest.

$\frac{1}{2}$ $\frac{1}{12}$ $\frac{1}{3}$ $\frac{5}{8}$ $\frac{10}{12}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{7}{12}$ $\frac{2}{3}$

.....

Calculate this fraction addition and the equivalent fractions.

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{\quad}{8} = \frac{6}{\quad} = \frac{\quad}{2}$

Over the tens

38 + ... = 59
47 + ... = 62
21 + ... = 40
35 + ... = 52
88 + ... = 101
91 + ... = 107
97 + ... = 114
99 + ... = 121
76 + ... = 106

Adding in parts

24 + 9 » 30 + 3 = 33
46 + 6 » .....
68 + 5 » .....
57 + 9 » .....
87 + 8 » .....
35 + 7 » .....
68 + 6 » .....
79 + 4 » .....
48 + 3 » .....

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step: 1	2	3	4
1	1	1	1
2	2	2	2
(1+2=3)» 3	3	3	
(2+3=5)» 5	5		
(3+5=8)» 8			

Time yourself for 1 minute with each of these starting numbers.

1  5

4 6

.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
..... Very Good!	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
..... Excellent!	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
..... Amazing!	.....
.....	.....
.....	.....
.....	.....

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METHODS OF MULTIPLICATION

Here is how to multiply numbers close to 100. e.g. 88 × 98.
88 is 12 below 100 and 98 is 2 below 100.
Look at how the product is found then use the method to find the other products.

88 × 98

88 12
× 98 2
8 6 2 4

2 × 12 = 24
98 − 12 = 86
or 88 − 2 = 86

96 × 93

96 4
× 93 7

92 × 94

92 8
× 94 6

96 × 91

96
× 91

95 × 91

95
× 91

73 × 99

73
× 99

92 × 89

92
× 89

87 × 89

87
× 89

MORE METHODS OF MULTIPLICATION

You can break up numbers into easier additions. Look at the method below then find the products.

82
× 9
80 × 9 = 720
2 × 9 = 18
738

97
× 4
90 × 4 = 360
7 × 4 = 28

53
× 5
50 × 5 =
3 × 5 =

74
× 6

68
× 7

82
× 8

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MORE METHODS OF MULTIPLICATION

Below is how to quickly multiply numbers that are just a little bigger that 100.

e.g. 103 × 106 = 10918

The answer is in two parts 109 (103 + 6 = 109) and 18 (3 × 6 = 18).

Use this method to quickly find these products.

107 × 101 = ...	105 × 106 = ...	103 × 107 = ...
104 × 104 = ...	109 × 108 = ...	101 × 114 = ...
103 × 102 = ...	110 × 105 = ...	102 × 123 = ...

SUMS OF CONSECUTIVE NUMBERS

The numbers below can be expressed as the sum of consecutive integers. Some have been completed for you. Finish the rest.

2 = not possible

3 = ...

4 = not possible

5 = ...

6 = ...

7 = ...

8 = not possible

9 = ...

10 = ...

11 = ...

12 = ...

13 = ...

14 = ...

15 = ...

16 = not possible

17 = ...

18 = ...

19 = ...

20 = ...

21 = 1 + 2 + 3 + 4 + 5 + 6

22 = ...

23 = ...

24 = ...

25 = ...

26 = ...

27 = ...

28 = 1 + 2 + 3 + 4 + 5 + 6 + 7

29 = ...

30 = ...

31 = ...

32 = not possible

33 = ...

34 = ...

35 = ...

36 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8

37 = ...

38 = ...

39 = ...

40 = ...

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BEMA

$(11 + 9) \times 2$ » .....

$5 + 8 \times 6$ » .....

$6 + 1 \times 2 + 7$ » .....

$66 - (18 - 6) \times 5$ » .....

$18 \div 3 + 8 \times 4$ » .....

$6 \times (23 - 8)$ » .....

$5^2 \times 6 - 20$ » .....

$55 - (5 \times 2^3)$ » .....

$[5 \times (7 + 3)] \times 2$ » .....

$(12 - 8)^3 - 9$ » .....

$(53 + 7) \div (18 \div 9)$ » .....

$3^3 + 2^3 \times 2$ » .....

$(4 + 7)^2 \pm 21$ » .....

$(8 + 2)^2 - (4 + 3)^2$ » .....

$65 - (16 \div 8 \times 2)^2$ » .....

$5 + 5 \times 5^2$ » .....

$[2 \times (5 + 1)] \times 3^2$ » .....

$[2 \times (1 + 2)^2 + 2]^2$ » .....

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NUMBER HUNT

+						
2	11				12	
4		12	16	11		
	10					5
3		11				
					16	

×	11			9		
	33					
12		72	60			
				45		
					64	
11					88	
6						24

OVER THE TENS

$25 + \ldots\ldots = 32$

$56 + \ldots\ldots = 64$

$35 + \ldots\ldots = 44$

$46 + \ldots\ldots = 51$

$97 + \ldots\ldots = 105$

$86 + \ldots\ldots = 95$

$95 + \ldots\ldots = 121$

$98 + \ldots\ldots = 133$

$85 + \ldots\ldots = 117$

ADDING IN PARTS

$43 + 8$ » $50 + 1 = 51$

$77 + 5$ » .....

$59 + 4$ » .....

$68 + 9$ » .....

$79 + 7$ » .....

$34 + 9$ » .....

$85 + 6$ » .....

$28 + 3$ » .....

$57 + 5$ » .....

MORE OVER THE TENS

$56 + \ldots\ldots = 95$

$37 + \ldots\ldots = 64$

$18 + \ldots\ldots = 42$

$57 + \ldots\ldots = 94$

$28 + \ldots\ldots = 75$

$36 + \ldots\ldots = 63$

$68 + \ldots\ldots = 96$

$33 + \ldots\ldots = 81$

$41 + \ldots\ldots = 55$

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METHODS OF MULTIPLICATION

Sometimes the biggest numbers are the easiest to square.
Look at the method below then finish the rest.

96^2 $96 \pm 4 = 100, 92$
$100 \times 92 + 4^2$
$= 9216$

39^2 $39 \pm 1 = 40, 38$
$40 \times 38 + 1^2$
$= 1521$

87^2 $87 \pm 3 = 90, 84$
$90 \times 84 + 3^2$
$= 7569$

14^2 .....

18^2 .....

37^2 .....

65^2 .....

76^2 .....

98^2 .....

41^2 .....

52^2 .....

69^2 .....

MORE METHODS OF MULTIPLICATION

You can break up numbers into easier additions. Look at the method below then find the products.

		42			33			84
		× 44			× 41			× 76
42×40	=	1680	33×40	=	1320	84×70	=	5880
42×4	=	168	33×1	=	33	84×6	=	504
		1848			1353			

		27			44			62
		× 15			× 22			× 34

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Complete these tables.

Add 15 to each number.

n	3	5	7	9	11	15	21	25	33	37
n + 15										

Multiply each number by 2 and add 5.

n	2	4	6	8	10	20	28	32	36	44
2n + 5										

Multiply each number by 3 and subtract 2.

n	5	10	15	20	25	30	35	40	45	50
3n - 2										

Square each number and then add the number to that square.

n	1	2	3	4	5	6	7	8	9	10
$n^2 + n$										

Square each number and multiply it by 3.

n	1	2	3	4	5	6	7	8	9	10
$3n^2$										

Complete these Fibonacci Series and calculate the totals.

2	1	4	3	5	6
5	9	6	4	10	7
7	.....	.....	.....	.....	.....
12	.....	.....	.....	.....	.....
19	.....	.....	.....	.....	.....
31	.....	.....	.....	.....	.....

Complete the magic square.

30		
		26
14		

Magic Number = 54

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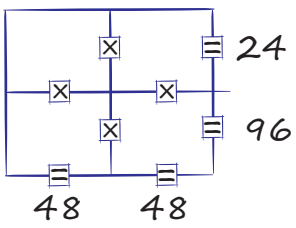
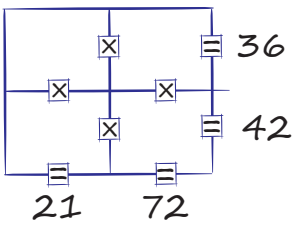
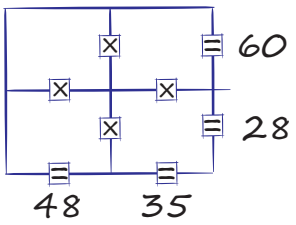
Adding

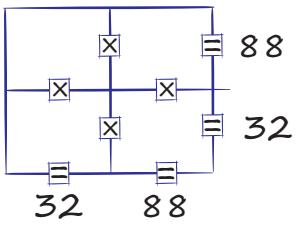
35 + 6 = ...	55 + 19 = ...	65 + 27 = ...
55 + 8 = ...	95 + 16 = ...	85 + 25 = ...
85 + 9 = ...	35 + 18 = ...	45 + 26 = ...
25 + 7 = ...	85 + 17 = ...	35 + 28 = ...
65 + 8 = ...	45 + 15 = ...	25 + 27 = ...
95 + 5 = ...	35 + 17 = ...	35 + 29 = ...
45 + 7 = ...	75 + 18 = ...	55 + 26 = ...
75 + 9 = ...	25 + 16 = ...	75 + 29 = ...
15 + 6 = ...	65 + 19 = ...	95 + 28 = ...

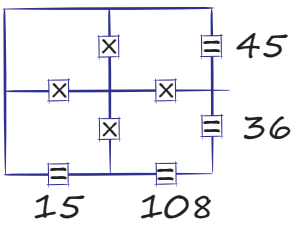
Multiplication squares

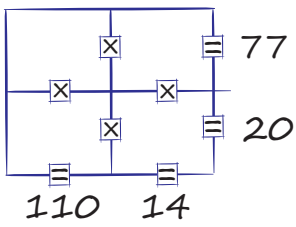




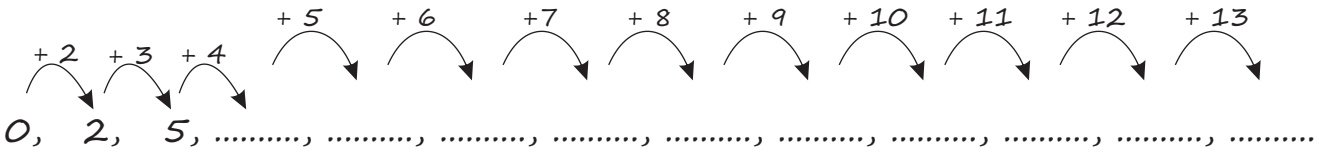


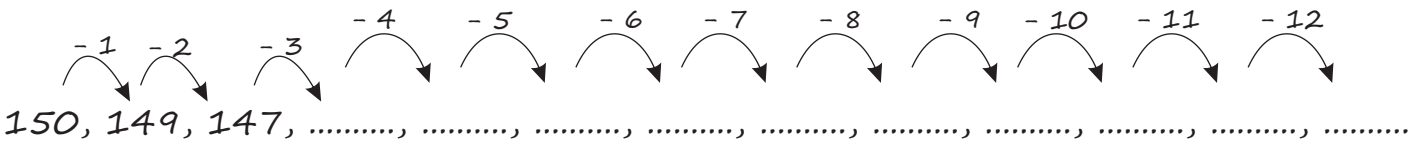


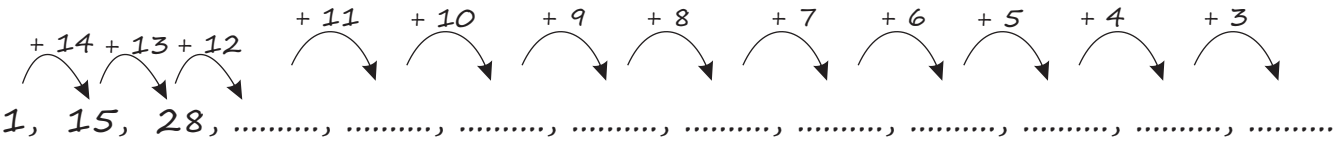


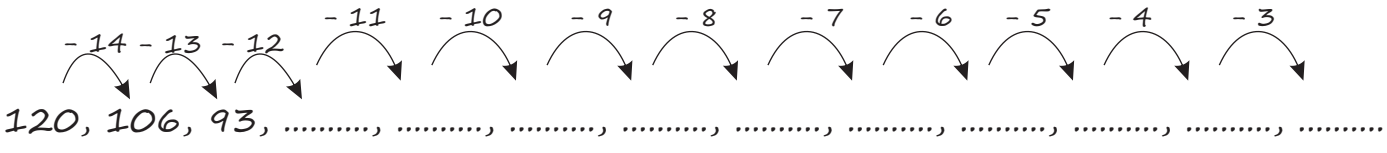


SEQUENCES









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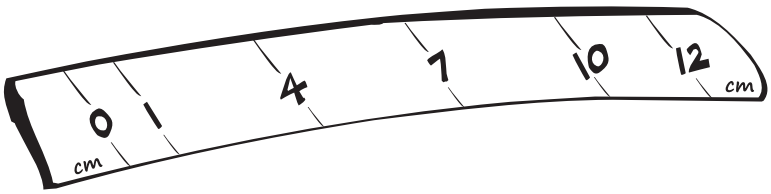
MIGHTY MATHS NUMERACY PROJECT



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The ruler shown is different to most. However you can still draw lines between 0 and 12 cm. Write how you would draw lines of these lengths.

2cm ..... Use the distance between 10 and 12 cm .....

3 cm ..... Use the distance between 1 and 4 cm .....

5 cm ..... Use the distance between 7 and 12 cm .....

6 cm ..... Use the distance between 4 and 10 cm or 1 and 7 cm .....

8 cm ..... Use the distance between 4 and 12 cm .....

9 cm ..... Use the distance between 1 and 10 cm .....

11 cm ..... Use the distance between 1 and 12 cm .....

$6 + 18 + 2 + 4 = 30$

$5 + 21 + 9 + 15 = 50$

$9 + 8 + 5 + 2 + 5 = 29$

$14 + 18 + 6 + 12 + 8 + 2 = 60$

$13 + 18 + 10 + 7 + 2 = 50$

$14 + 16 + 17 + 3 = 50$

$27 + 35 + 13 + 15 = 90$

$32 + 65 + 68 + 35 + 50 = 250$

$92 + 46 + 20 + 54 + 8 = 220$

Is there a quick way of adding these?

Find the totals of each of these Fibonacci Series.

2	1	4
3	5	8
5	6	12
8	11	20
13	17	32
21	28	52
34	45	84
86	113	212

MIGHTY MAGIC SQUARE

All the rows, columns and diagonals should add to the same number.

8	1	6
3	5	7
4	9	2

Magic Number = 15

Fill in the gaps.

$6 + 18 = 15 + 9$

$15 + 45 = 4 \times 15$

$8 \times 4 = 23 + 9$

$100 \div 5 = 6 + 14$

$10 + 20 = 2 \times 15$

$12 + 88 = 5 \times 20$

$9 \times 12 = 55 + 53$

$102 \div 2 = 30 + 21$

$1 + 2 + 3 + 4 = 10$

$7 + 8 + 9 + 10 = 34$

$1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 5 + 5 = 30$

$3 + 4 + 5 + 6 = 18$

$5 + 6 + 7 + 8 = 26$

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MIGHTY MATHS NUMERACY PROJECT

Complete these tables.

Add 3 to each.

n	3	5	7	8	12	14	27	36	42	58
n + 3	6	8	10	11	15	17	30	39	45	61

Subtract 5 from each.

n	8	6	7	5	11	19	22	34	43	50
n - 5	3	1	2	0	6	14	17	29	38	45

A quick way of multiplying by 4 is doubling then doubling again.

15 × 4 is the same as 15 × 2 × 2

15 × 2 = 30 »» and »» 30 × 2 = 60

therefore 15 × 4 = 60

Multiply each by 2 then 2 again.

n	9	13	17	28	15	14	21	26
2n	18	26	34	56	30	28	42	52
4n	36	52	68	112	60	56	84	104

Divide each by 3.

n	36	45	54	66	72	78	81	99
n ÷ 3	12	15	18	22	24	26	27	33

Fill in the gaps.

18 + 2 = 15 + 5

42 ÷ 7 = 9 - 3

40 + 10 = 5 × 10

100 - 20 = 40 × 2

34 - 4 = 15 × 2

4 × 9 = 3 × 12

3 × 2 × 5 = 30

8 + 2 = 5 + 5

4 × 2 × 9 = 72

16 ÷ 4 = 2 × 2

42 × 2 = 12 × 7

5 × 6 = 3 × 10

Find the pattern then complete the next 5 numbers.

4, 8, 12, 16, 20, 24, 28, 32

84, 77, 70, 63, 56, 49, 42, 35

1, 3, 6, 10, 15, 21, 28, 36, 45, 55

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step: 1	2	3	4
1	1	1	1
2	2	2	2
(1+2=3)» 3	3	3	
(2+3=5)» 5	5		
(3+5=8)» 8			

Time yourself for 1 minute with each of these starting numbers.

1	2
3	4

4	6
7	10
11	16
18	26
29	42
47	68
76	110
123 Very Good!	178
199	288
322	466
521	754
843	1220
1364	1974
2207 Excellent!	3194
3571	5168
5778	8362
9349	13530
15127	21892
24476	35422
39603 Amazing!	57314
64079	92736
103682	150050
167761	242786

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What must be added to:

- 5×9 to make 50? 5
- 4×3 to make 20? 8
- 6×6 to make 40? 4
- 9×8 to make 90? 18
- 11×2 to make 30? 8
- 7×7 to make 60? 11
- 3×10 to make 100? 70
- 8×7 to make 70? 14
- 12×5 to make 80? 20

Find two numbers that:

- Add to 9 and whose product is 20 — 5, 4
- Add to 15 and whose product is 56 — 8, 7
- Add to 16 and whose product is 48 — 12, 4
- Add to 10 and whose product is 16 — 8, 2
- Add to 11 and whose product is 24 — 8, 3

Write these numbers as words:

- 58 — fifty eight
- 220 — two hundred and twenty
- 4 800 — four thousand eight hundred
- 51 000 — fifty one thousand
- 100 000 — one hundred thousand

What is the remainder when:

- 19 is divided by 5? 4
- 27 is divided by 8? 3
- 68 is divided by 11? 2
- 52 is divided by 3? 1
- 100 is divided by 8? 4

Halve these 5 times:

8	4	2	1	½	¼
80	40	20	10	5	2½
48	24	12	6	3	1½
112	56	28	14	7	3½
256	128	64	32	16	8
320	160	80	40	20	10
480	240	120	60	30	15
3 200	1600	800	400	200	100

Double these numbers 7 times:

2	15	25
4	30	50
8	60	100
16	120	200
32	240	400
64	480	800
128	960	1600
256	1920	3200

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MIGHTY MATHS NUMERACY PROJECT

This list contains all the products that you need to know.
Write each product.

2 × 2 = 4	5 × 8 = 40
2 × 3 = 6	5 × 9 = 45
2 × 4 = 8	5 × 10 = 50
2 × 5 = 10	5 × 11 = 55
2 × 6 = 12	5 × 12 = 60
2 × 7 = 14	6 × 6 = 36
2 × 8 = 16	6 × 7 = 42
2 × 9 = 18	6 × 8 = 48
2 × 10 = 20	6 × 9 = 54
2 × 11 = 22	6 × 10 = 60
2 × 12 = 24	6 × 11 = 66
3 × 3 = 9	6 × 12 = 72
3 × 4 = 12	7 × 7 = 49
3 × 5 = 15	7 × 8 = 56
3 × 6 = 18	7 × 9 = 63
3 × 7 = 21	7 × 10 = 70
3 × 8 = 24	7 × 11 = 77
3 × 9 = 27	7 × 12 = 84
3 × 10 = 30	8 × 8 = 64
3 × 11 = 33	8 × 9 = 72
3 × 12 = 36	8 × 10 = 80
4 × 4 = 16	8 × 11 = 88
4 × 5 = 20	8 × 12 = 96
4 × 6 = 24	9 × 9 = 81
4 × 7 = 28	9 × 10 = 90
4 × 8 = 32	9 × 11 = 99
4 × 9 = 36	9 × 12 = 108
4 × 10 = 40	10 × 10 = 100
4 × 11 = 44	10 × 11 = 110
4 × 12 = 48	10 × 12 = 120
5 × 5 = 25	11 × 11 = 121
5 × 6 = 30	11 × 12 = 132
5 × 7 = 35	12 × 12 = 144

Halve these numbers three times.

120 = 60, 30, 15
200 = 100, 50, 25
660 = 330, 165, 82½
240 = 120, 60, 30
460 = 230, 115, 57½
180 = 90, 45, 22½
380 = 190, 95, 47½
512 = 256, 128, 64

Multiplying by 5 is the same as multiplying by 10 and halving.

5 × 46 = ½ of 10 × 46
= ½ of 460
= 230

Multiply these numbers by 5.

5 × 24 = 120	80 × 5 = 400
5 × 18 = 90	66 × 5 = 330
5 × 32 = 160	48 × 5 = 240
5 × 68 = 340	92 × 5 = 460
5 × 74 = 370	28 × 5 = 140
5 × 14 = 70	50 × 5 = 250
5 × 86 = 430	15 × 5 = 75
5 × 71 = 355	87 × 5 = 435
5 × 23 = 115	55 × 5 = 275
5 × 99 = 495	69 × 5 = 345
5 × 83 = 415	47 × 5 = 235
5 × 37 = 185	16 × 5 = 80

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Fill in the missing sums.

+	7	9	3	12	4	8	5	14	6	10
4	11	13	7	16	8	12	9	18	10	14
12	19	21	15	24	16	20	17	26	18	22
2	9	11	5	14	6	10	7	16	8	12
8	15	17	11	20	12	16	13	22	14	18
6	13	15	9	18	10	14	11	20	12	16
15	22	24	18	27	19	23	20	29	21	25
5	12	14	8	17	9	13	10	19	11	15
11	18	20	14	23	15	19	16	25	17	21
13	20	22	16	25	17	21	18	27	19	23
3	10	12	6	15	7	11	8	17	9	13

Keep doubling each number in the column.

Calculate the totals of each column.

2	5
4	10
8	20
16	40
32	80
64	160
128	320
256	640
512	1280
1024	2560
2046	5115

What must be added to:

- 2 × 3 to make 10? ....4....
- 4 × 3 to make 20? ....8....
- 12 × 2 to make 30? ....6....
- 3 × 12 to make 40? ....4....
- 8 × 6 to make 50? ....2....
- 7 × 8 to make 60? ....4....
- 9 × 7 to make 70? ....7....
- 6 × 12 to make 80? ....8....
- 10 × 8 to make 90? ....10....
- 9 × 9 to make 100? ....19....
- 12 × 9 to make 120? ....12....

What is the remainder when:

- 29 is divided by 2? ....1....
- 35 is divided by 3? ....2....
- 30 is divided by 4? ....2....
- 49 is divided by 5? ....4....
- 28 is divided by 6? ....4....
- 50 is divided by 7? ....1....
- 45 is divided by 8? ....5....
- 80 is divided by 9? ....8....
- 75 is divided by 10? ....5....
- 52 is divided by 11? ....8....
- 100 is divided by 12? ....4....

Fill in the spaces.

- ....39.... + 11 = 50
- ....42.... − 12 = 30
- ....11.... × 9 = 99
- 18 ÷ ....3.... = 6
- 20 + ...20.... = 40
- ....20.... × 3 = 60
- 6 × 0 = ...0....
- 99 + 7 = ...106....
- 12 × ....12.... = 144
- ....21.... − 6 = 15
- ....56.... ÷ 7 = 8

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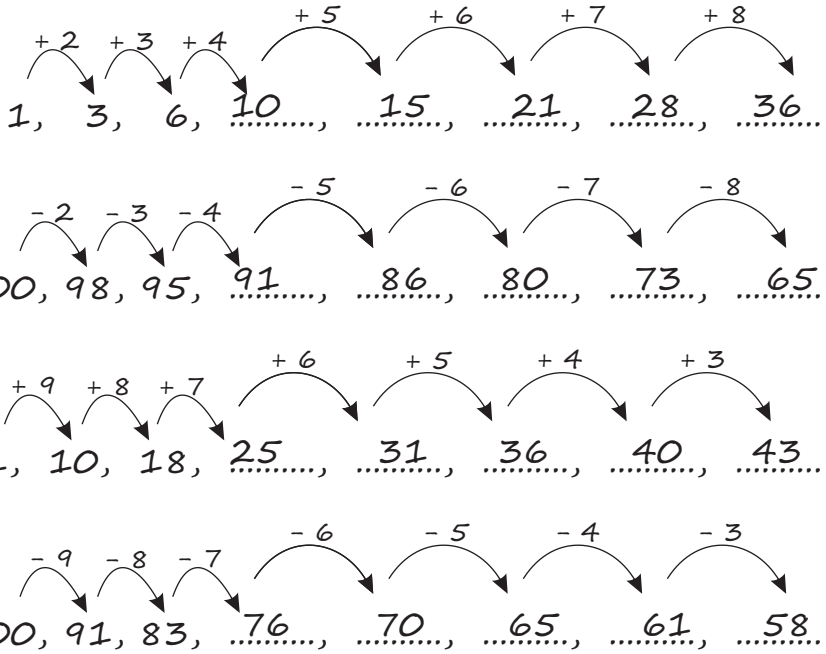
MIGHTY MATHS NUMERACY PROJECT



Complete this table:

n	n^2	$n^2 + 2$	n^3	$n^3 + 5$
1	$1^2 = 1$	3	$1^3 = 1$	6
2	$2^2 = 4$	6	$2^3 = 8$	13
3	$3^2 = 9$	11	$3^3 = 27$	32
4	$4^2 = 16$	18	$4^3 = 64$	69
5	$5^2 = 25$	27	$5^3 = 125$	130
6	$6^2 = 36$	38	$6^3 = 216$	221
7	$7^2 = 49$	51	$7^3 = 343$	348
8	$8^2 = 64$	66	$8^3 = 512$	517
9	$9^2 = 81$	83	$9^3 = 729$	734
10	$10^2 = 100$	102	$10^3 = 1000$	1005

58 + 13 is the same as 58 + 10 + 3 = 68 + 3 = 71

75 + 29 is the same as 75 + 20 + 9 = 104

67 + 15 is the same as 67 + 10 + 5 = 82

84 + 27 is the same as 84 + 20 + 7 = 111

49 + 19 is the same as 49 + 10 + 9 = 68

57 + 24 is the same as 57 + 20 + 4 = 81

76 + 35 is the same as 76 + 30 + 5 = 111

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step:	1	2	3	4
	1	1	1	1
	2	2	2	2
(1+2=3)»	3	3	3	
(2+3=5)»	5	5		
(3+5=8)»	8			

Time yourself for 1 minute with each of these starting numbers.

0	5
3	10
3	15
6	25
9	40
15	65
24	105
39	170
63	275
102 Very Good!	445
165	720
267	1165
432	1885
699	3050
1131	4935
1830 Excellent!	7985
2961	12920
4791	20905
7752	33825
12543	54730
20295	88555
32838 Amazing!	143285
53133	231840
85971	375125
139104	606965

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4A

MIGHTY MATHS NUMERACY PROJECT

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This list contains all the products that you need to know.

2 × 2 = 4	9 × 7 = 63
3 × 2 = 6	9 × 8 = 72
3 × 3 = 9	9 × 9 = 81
4 × 2 = 8	10 × 2 = 20
4 × 3 = 12	10 × 3 = 30
4 × 4 = 16	10 × 4 = 40
5 × 2 = 10	10 × 5 = 50
5 × 3 = 15	10 × 6 = 60
5 × 4 = 20	10 × 7 = 70
5 × 5 = 25	10 × 8 = 80
6 × 2 = 12	10 × 9 = 90
6 × 3 = 18	10 × 10 = 100
6 × 4 = 24	11 × 2 = 22
6 × 5 = 30	11 × 3 = 33
6 × 6 = 36	11 × 4 = 44
7 × 2 = 14	11 × 5 = 55
7 × 3 = 21	11 × 6 = 66
7 × 4 = 28	11 × 7 = 77
7 × 5 = 35	11 × 8 = 88
7 × 6 = 42	11 × 9 = 99
7 × 7 = 49	11 × 10 = 110
8 × 2 = 16	11 × 11 = 121
8 × 3 = 24	12 × 2 = 24
8 × 4 = 32	12 × 3 = 36
8 × 5 = 40	12 × 4 = 48
8 × 6 = 48	12 × 5 = 60
8 × 7 = 56	12 × 6 = 72
8 × 8 = 64	12 × 7 = 84
9 × 2 = 18	12 × 8 = 96
9 × 3 = 27	12 × 9 = 108
9 × 4 = 36	12 × 10 = 120
9 × 5 = 45	12 × 11 = 132
9 × 6 = 54	12 × 12 = 144

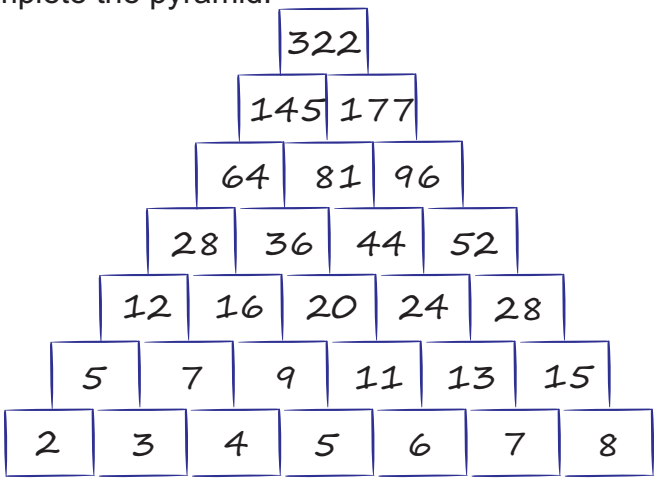
Keep doubling each number in the columns and then calculate the totals of each column.

1	3	7	9
2	6	14	18
4	12	28	36
8	24	56	72
16	48	112	144
32	96	224	288
64	192	448	576
128	384	896	1152
256	768	1792	2304
511	1533	3577	4599

Calculate the rest of the terms.

Term 1	$1 + 1^2$	=	2
Term 2	$2 + 2^2$	=	6
Term 3	$3 + 3^2$	=	12
Term 4	$4 + 4^2$	=	20
Term 5	$5 + 5^2$	=	30
Term 6	$6 + 6^2$	=	42
Term 7	$7 + 7^2$	=	56
Term 8	$8 + 8^2$	=	72
Term 9	$9 + 9^2$	=	90
Term 10	$10 + 10^2$	=	110

Complete the pyramid.



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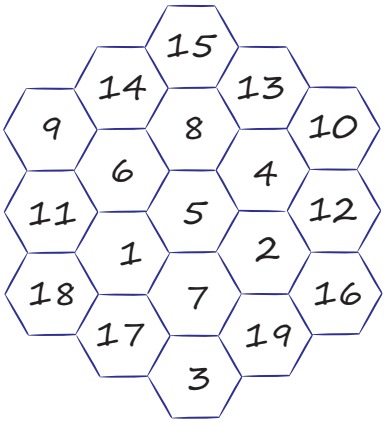
HONEY COMB MATHS

Place the numbers 1 - 19 in such a way that all the columns and all the diagonals sum to 38.

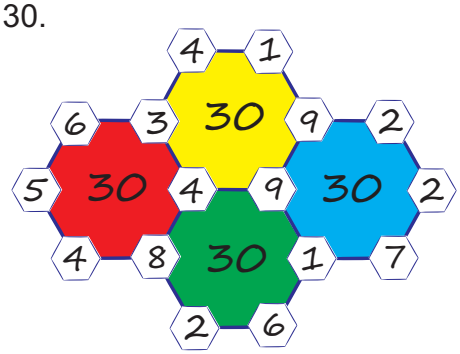


Write down all the combinations of 3 numbers that sum to 11.

10 + 1 + 0 = 11
9 + 2 + 0 = 11
8 + 3 + 0 = 11
8 + 2 + 1 = 11
7 + 3 + 1 = 11
6 + 5 + 0 = 11
6 + 4 + 1 = 11
6 + 3 + 2 = 11
5 + 4 + 2 = 11

HONEY COMB MATH2

Use the numbers from 1 to 9. The six numbers around each large hexagon should add up to 30.



(This is just 1 of 2 possible answers)

BECOME SUMBODY

1 + 2 + 3 + 4 = 10
3 + 4 + 5 + 6 = 18
5 + 6 + 7 + 8 = 26
7 + 8 + 9 + 10 = 34
17 + 3 = 20
18 + 12 = 30
25 + 15 = 40
11 + 39 = 50
16 + 24 = 40
11 + 19 = 30
14 + 6 = 20
1 + 3 + 5 + 7 = 16
3 + 5 + 7 + 9 = 24
2 + 4 + 6 + 8 = 20

PARTITIONING

45 + 7 = 45 + 5 + 2
= 52

65 + 8 = 65 + 5 + 3
= 73

35 + 9 = 35 + 5 + 4
= 44

45 + 6 = 45 + 5 + 1
= 51

55 + 7 = 55 + 5 + 2
= 62

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step: 1	2	3	4
1	1	1	1
2	2	2	2
(1+2=3)» 3	3	3	
(2+3=5)» 5	5		
(3+5=8)» 8			

Time yourself for 1 minute with each of these starting numbers.

0	2
1	3
1	5
2	8
3	13
5	21
8	34
13	55
21	89
34 Very Good!	144
55	233
89	377
144	610
233	987
377	1597
610 Excellent!	2584
987	4181
1597	6765
2584	10946
4181	17711
6765	28657
10946 Amazing!	46368
17711	75025
28657	121393
46368	196418

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Keep doubling each number in the column.

Calculate the totals of each column.

2	25	15	11	6
4	50	30	22	12
8	100	60	44	24
16	200	120	88	48
32	400	240	176	96
64	800	480	352	192
126	1575	945	693	378

To find the sum of a total of doubled numbers,

double the last number,

$192 \times 2 = 384$

subtract the first number.

$384 - 6 = 378$

PARTITIONING

$14 + 27 = 10 + 20 + 4 + 7$

$= 30 + 11$

$= 41$

$34 + 19 = 30 + 10 + 4 + 9$

$= 40 + 13$

$= 53$

$28 + 36 = 20 + 30 + 8 + 6$

$= 50 + 14$

$= 64$

$43 + 27 = 40 + 20 + 3 + 7$

$= 60 + 10$

$= 70$

$54 + 38 = 50 + 30 + 4 + 8$

$= 80 + 12$

$= 92$

$56 + 29 = 50 + 20 + 6 + 9$

$= 70 + 15$

$= 85$

NUMBER HUNT

+	6	5	9	4	7	3	8
5	11	10	14	9	12	8	13
7	13	12	16	11	14	10	15
2	8	7	11	6	9	5	10
8	14	13	17	12	15	11	16
4	10	9	13	8	11	7	12
6	12	11	15	10	13	9	14

×	11	8	5	9	7	3	6
3	33	24	15	27	21	9	18
12	132	96	60	108	84	36	72
9	99	72	45	81	63	27	54
5	55	40	25	45	35	15	30
11	121	88	55	99	77	33	66
8	88	64	40	72	56	24	48

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22 × 16

×	10	10	2
10	100	100	20
6	60	60	12

= 352

25 × 18

×	10	10	5
10	100	100	50
8	80	80	40

= 450

27 × 12

×	10	10	7
10	100	100	70
2	20	20	14

= 324

21 × 19

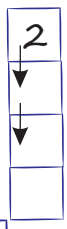
×	10	10	1
10	100	100	10
9	90	90	9

= 399

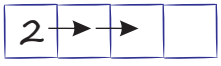
NUMBER TRAIL

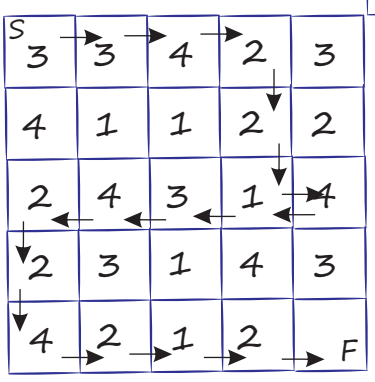
Start at the S.
Try to reach F.

Landing on a 2 means:



or





	2			5			8	9			12	13	14	15		17	18
	20		22		24		26		28	29		31	32	33		35	36
	38		40	41	42		44	45	46		48	49					
	56	57		59		61	62	63		65	66	67	68	69		71	72
	74	75	76		78	79	80					85	86	87		89	90

Calculate each answer then shade that number on the grid above.

1 × 1 = 1	13 + 34 = 47
2 + 1 = 3	24 + 26 = 50
2 + 2 = 4	37 + 14 = 51
12 − 6 = 6	44 + 8 = 52
6 + 1 = 7	39 + 14 = 53
8 + 2 = 10	42 + 12 = 54
22 − 11 = 11	70 − 15 = 55
12 + 4 = 16	85 − 27 = 58
13 + 6 = 19	90 − 30 = 60
7 + 7 + 7 = 21	100 − 36 = 64
30 − 7 = 23	86 − 16 = 70
5 × 5 = 25	92 − 19 = 73
9 + 9 + 9 = 27	83 − 6 = 77
15 + 15 = 30	9 × 9 = 81
15 + 19 = 34	55 + 27 = 82
18 + 19 = 37	47 + 36 = 83
28 + 11 = 39	55 + 29 = 84
35 + 8 = 43	69 + 19 = 88

THE TELEPHONE NUMBER

1. Use a calculator.
2. Key in the first 3 digits of your phone number.
3. Multiply by 80.
4. Add 1.
5. Multiply by 250.
6. Add the last 4 digits of your phone number.
7. Repeat the last step.
   (i.e. add the last 4 digits of your phone number again).
8. Subtract 250.
9. Divide by 2.
10. What is the answer? *your telephone number!*

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Below are all the multiplications that you need to know. Complete each product.

5 × 11 = 55	5 × 8 = 40
2 × 2 = 4	2 × 4 = 8
12 × 12 = 144	5 × 9 = 45
2 × 6 = 12	2 × 5 = 10
10 × 11 = 110	5 × 12 = 60
2 × 7 = 14	6 × 6 = 36
2 × 12 = 24	4 × 7 = 28
3 × 3 = 9	6 × 9 = 54
10 × 12 = 120	2 × 3 = 6
3 × 4 = 12	6 × 11 = 66
6 × 8 = 48	3 × 12 = 36
3 × 5 = 15	7 × 7 = 49
7 × 8 = 56	2 × 11 = 22
11 × 12 = 132	3 × 6 = 18
3 × 7 = 21	4 × 10 = 40
6 × 12 = 72	7 × 9 = 63
3 × 8 = 24	7 × 12 = 84
9 × 10 = 90	8 × 9 = 72
3 × 10 = 30	4 × 5 = 20
7 × 11 = 77	8 × 10 = 80
3 × 11 = 33	6 × 7 = 42
4 × 4 = 16	2 × 8 = 16
8 × 8 = 64	8 × 12 = 96
9 × 12 = 108	3 × 9 = 27
4 × 6 = 24	5 × 10 = 50
11 × 11 = 121	9 × 9 = 81
4 × 9 = 36	6 × 10 = 60
10 × 10 = 100	9 × 11 = 99
4 × 12 = 48	2 × 9 = 18
5 × 6 = 30	2 × 10 = 20
5 × 7 = 35	4 × 8 = 32
7 × 10 = 70	5 × 5 = 25
4 × 11 = 44	8 × 11 = 88

Division Tips - Dividing By Three

To calculate if you can divide a number evenly by three, add up all the digits. If THAT sum is divisible by three, then so is the original number.

e.g. 8787 8 + 7 + 8 + 7 = 30

30 is divisible by 3
so 8787 is too.

Are these numbers divisible evenly by 3?

1962	18	(Yes) No
29625	24	(Yes) No
8884	28	Yes (No)
6738	24	(Yes) No
13972	22	Yes (No)

Division Tips - Dividing By Six

If a number is BOTH divisible by three AND is an even number (ending in 0,2,4, 6 or 8) then it is divisible by six too.

e.g. 312 is an even number
add up all the digits = 6
6 is divisible by three.
Therefore 312 is divisible by six.

Are these numbers divisible evenly by 6?

7402	13	Yes (No)
5286	21	(Yes) No
4721	14	Yes (No)
2116	10	Yes (No)
64764	27	(Yes) No

Division Tips - Dividing By Nine

Use the same method as dividing by three - but divide the final answer by 9.

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1 → +8 → 9 → +8 → 17

100 → -6 → 94 → -6 → 88

25	82
33	76
41	70
49	64
57	58
65	52
73	46
81	40
89	34
97	28

JUST FOR FUN

Maths equatic ach letter of the alphabet a number fr , B = 2, C = 3, D = 4 etc.

Use th m totals of the following:

Conclusion: Luck has little to do with it. Hard work and knowledge will get you close. It is your attitude that will get you there

2 + 21 + 3 + 11 = 47 %

ORK = 8+1+18+4+23+15+18+11 = 98 %

KNOWLEDGE = 11+14+15+23+12+5+4+7+5 = 96 %

ATTITUDE = 1+20+20+9+20+21+4+5 = 100 %

The Multiply by 11 Rule

23 × 11 = ... » **Step 1:** 23 × 11 = 2 (split the digits apart) 3 »» **Step 2:** 23 × 11 = 253 (2 + 3 = 5, add the digits)

54 × 11 = ... » **Step 1:** 54 × 11 = 5 4 »» **Step 2:** 54 × 11 = 594 (5 + 4 = 9)

76 × 11 = ... » **Step 1:** 76 × 11 = 7 6 »» **Step 2:** 76 × 11 = 836 (7 + 6 = 13)

Look at the examples above and then use this quick method to multiply these numbers by 11.

35 × 11 = 385	81 × 11 = 891	52 × 11 = 572
24 × 11 = 264	45 × 11 = 495	11 × 11 = 121
41 × 11 = 451	22 × 11 = 242	32 × 11 = 352
59 × 11 = 649	67 × 11 = 737	88 × 11 = 968
29 × 11 = 319	95 × 11 = 1045	39 × 11 = 429
48 × 11 = 528	79 × 11 = 869	55 × 11 = 605

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Find 2 numbers whose:

sum is 13 and product is 36. $a + b = 13, a \times b = 36$ $a =$ 9 $b =$ 4

sum is 11 and product is 30. $a + b = 11, a \times b = 30$ $a =$ 6 $b =$ 5

sum is 52 and product is 100. $a + b = 52, a \times b = 100$ $a =$ 50 $b =$ 2

sum is 16 and product is 15. $a + b = 16, a \times b = 15$ $a =$ 15 $b =$ 1

sum is 18 and product is 72. $a + b = 18, a \times b = 72$ $a =$ 12 $b =$ 6

PARTITIONING

$28 + 25 = 20 + 20 + 8 + 5$
$= 40 + 13$
$= 53$

$37 + 18 = 30 + 10 + 7 + 8$
$= 40 + 15$
$= 55$

$22 + 39 = 20 + 30 + 2 + 9$
$= 50 + 11$
$= 61$

$45 + 27 = 40 + 20 + 5 + 7$
$= 60 + 12$
$= 72$

$26 + 16 = 20 + 10 + 6 + 6$
$= 30 + 12$
$= 42$

$49 + 38 = 40 + 30 + 9 + 8$
$= 70 + 17$
$= 87$

NUMBER BONDS

2 + 8 = 10
5 + 5 = 10
3 + 7 = 10
6 + 4 = 10
7 + 13 = 20
17 + 3 = 20
9 + 11 = 20
5 + 15 = 20
8 + 12 = 20
18 + 2 = 20
10 + 10 = 20
18 + 2 = 20
9 + 11 = 20
25 + 5 = 30
15 + 15 = 30
7 + 23 = 30
19 + 11 = 30
22 + 8 = 30
18 + 12 = 30
5 + 25 = 30

34 + 6 = 40
18 + 22 = 40
35 + 5 = 40
21 + 19 = 40
27 + 13 = 40
19 + 21 = 40
26 + 14 = 40
9 + 31 = 40
38 + 12 = 50
20 + 30 = 50
34 + 16 = 50
19 + 31 = 50
25 + 25 = 50
36 + 14 = 50
18 + 32 = 50
29 + 21 = 50
24 + 26 = 50
18 + 32 = 50
15 + 35 = 50
18 + 32 = 50

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Complete these multiplication tables.

×	10	10	6
10	100	100	60
4	40	40	24

26 × 14 = 364

×	10	10	5
10	100	100	50
2	20	20	10

25 × 12 = 300

×	10	10	3
10	100	100	30
3	30	30	9

23 × 13 = 299

×	10	10	9
10	100	100	90
3	30	30	27

29 × 13 = 377

×	10	10	4
10	100	100	40
5	50	50	20

24 × 15 = 360

Two Mighty Additions

987654321	123456789
087654321	123456780
007654321	123456700
000654321	123456000
000054321	123450000
000004321	123400000
000000321	123000000
000000021	120000000
+ 000000001	+ 100000000
1083676269	1083676269

11 × 7 = 77	11 × 9 = 99	10 × 2 = 20
9 × 4 = 36	6 × 4 = 24	4 × 3 = 12
6 × 2 = 12	10 × 10 = 100	10 × 3 = 30
9 × 9 = 81	8 × 7 = 56	3 × 2 = 6
12 × 11 = 132	6 × 6 = 36	10 × 6 = 60
5 × 3 = 15	11 × 5 = 55	7 × 6 = 42
10 × 7 = 70	7 × 3 = 21	12 × 7 = 84
7 × 5 = 35	10 × 9 = 90	11 × 2 = 22
10 × 4 = 40	7 × 7 = 49	8 × 4 = 32
5 × 2 = 10	11 × 11 = 121	11 × 3 = 33
12 × 12 = 144	8 × 2 = 16	7 × 2 = 14
8 × 6 = 48	12 × 8 = 96	11 × 4 = 44
11 × 10 = 110	8 × 3 = 24	6 × 3 = 18
9 × 2 = 18	11 × 6 = 66	3 × 3 = 9
5 × 4 = 20	8 × 5 = 40	12 × 2 = 24
12 × 4 = 48	12 × 9 = 108	7 × 4 = 28
2 × 2 = 4	9 × 3 = 27	10 × 5 = 50
4 × 4 = 16	4 × 2 = 8	8 × 8 = 64
12 × 3 = 36	12 × 10 = 120	12 × 5 = 60
9 × 6 = 54	9 × 5 = 45	9 × 8 = 72
10 × 8 = 80	12 × 6 = 72	6 × 5 = 30
5 × 5 = 25	9 × 7 = 63	11 × 8 = 88

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8A

MIGHTY MATHS NUMERACY PROJECT

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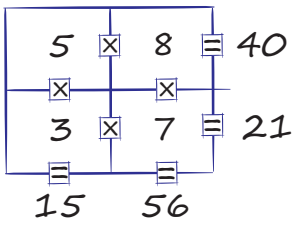
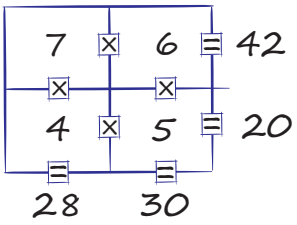
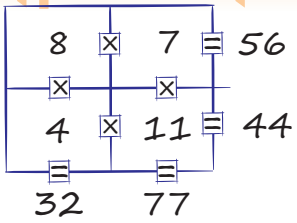
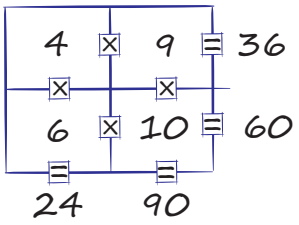
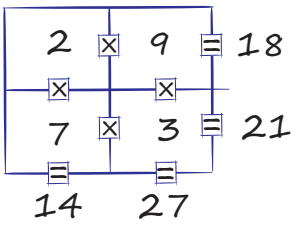
Complete these multiplication squares (the first is done for you).

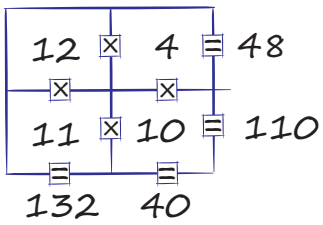












The Multiply by 11 Rule E X P A N D E D

41362 × 11 = ...

Step 1: Write down the number with a zero digit in front.
Step 2: Write down the units digit (the first digit).
Step 3+: Add each of the digit's neighbours on the left.

= 041362
= 2
= 82
= 982
= 4982
= 54982
= 454982

Multiply these numbers:

51236 × 11 = 563596

41813 × 11= 459943

53171 × 11= 584881

45362 × 11= 498982

12709 × 11= 139799

OVER THE TENS

28 + 8 = 36
57 + 6 = 63
31 + 14 = 45
45 + 9 = 54
98 + 5 = 103
81 + 16 = 97
97 + 27 = 124
99 + 32 = 131
86 + 30 = 116

ADDING IN PARTS

46 + 8 » 50 + 4 = 54
76 + 5 » = 81
58 + 4 » = 62
67 + 9 » = 76
77 + 7 » = 84
35 + 9 » = 44
88 + 6 » = 94
29 + 3 » = 32
55 + 5 » = 60

MORE OVER THE TENS

58 + 37 = 95
36 + 28 = 64
19 + 23 = 42
58 + 36 = 94
27 + 48 = 75
35 + 28 = 63
69 + 27 = 96
38 + 43 = 81
42 + 13 = 55

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Multiply up to 20 x 20 in your head.

Take two 2 digit numbers: e.g. 15 x 13

Take the first number and add the units digit of the second number. 15 + 3 = 18

Multiply this by 10 18 x 10 = 180

Multiply the units digits of both numbers and add to your last answer. 5 x 3 = 15

180 + 15 = 195

Therefore 15 x 13 = 195

Trying it again

14 x 18

14 + 8 = 22

220

4 x 8 = 32

220 + 32 = 252

Therefore 14 x 18 = 252

Use the method shown to quickly multiply these numbers.

12 × 16
(12 + 6) × 10 = 180
2 × 6 = 12
180 + 12 = 192

13 × 19
(13 + 9) × 10 = 220
3 × 9 = 27
220 + 27 = 247

17 × 18
(17 + 8) × 10 = 250
7 × 8 = 56
250 + 56 = 306

14 × 11
(14 + 1) × 10 = 150
4 × 1 = 4
150 + 4 = 154

15 × 17
(15 + 7) × 10 = 220
5 × 7 = 35
220 + 35 = 255

19 × 16
(19 + 6) × 10 = 250
9 × 6 = 54
250 + 54 = 304

18 × 12
(18 + 2) × 10 = 200
8 × 2 = 16
200 + 16 = 216

11 × 15
(11 + 5) × 10 = 160
1 × 5 = 5
160 + 5 = 165

13 × 14
(13 + 4) × 10 = 170
3 × 4 = 12
170 + 12 = 182

20 × 20
= 400
note the method only works with numbers up to 20.

Find the remainders when:

18 is divided by 5 .....3.....
69 is divided by 11 .....3.....
40 is divided by 7 .....5.....
42 is divided by 4 .....2.....
100 is divided by 8 .....4.....
59 is divided by 3 .....2.....

What must be added to:

9 × 7 to make 80 .....17.....
4 × 3 to make 30 .....18.....
5 × 9 to make 60 .....15.....
6 × 8 to make 70 .....22.....
7 × 4 to make 40 .....12.....
8 × 2 to make 50 .....34.....

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Fill in the gaps.

$8 \times 7 = 56$	$30 + 9 = 39$	$24 - 6 = 18$	$3 \times 13 = 39$
$100 \div 5 = 20$	$6 \times 4 = 24$	$8 + 7 = 15$	$35 \div 7 = 5$
$5 \times 0 = 0$	$99 + 8 = 107$	$20 \times 3 = 60$	$11^2 = 121$
$30 \times 9 = 270$	$81 \div 9 = 9$	$32 \times 3 = 96$	$15 \times 5 = 75$
$2^3 = 8$	$2^3 \times 2^3 = 64$	$4^2 \times 2^2 = 64$	$2 \times 5^2 = 50$
$89 + 99 = 188$	$10^2 - 9^2 = 19$	$5^2 \times 2 \times 4 = 200$	$8^2 - 4^3 = 0$
$21 + 23 = 44$	$23 + 25 = 48$	$25 + 27 = 52$	$27 + 29 = 56$
$95 - 23 = 72$	$95 - 25 = 70$	$95 - 27 = 68$	$95 - 29 = 66$

Some Beautiful Numbers

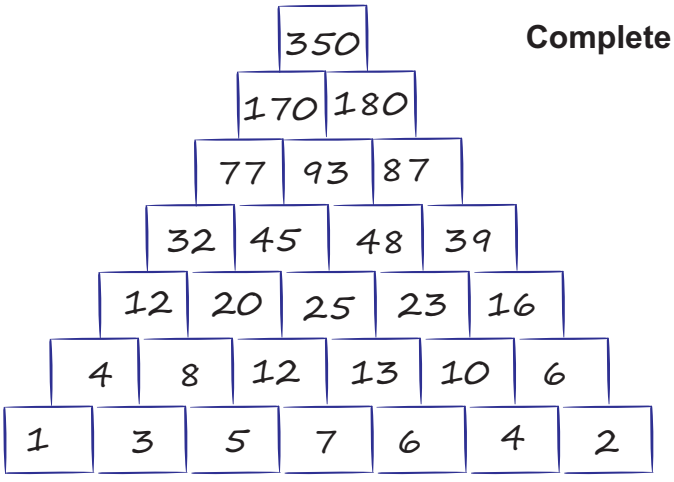
$1^1 + 3^2 + 5^3$	$1^1 + 7^2 + 5^3$	$5^{-1} + 1^2 + 8^3$
$= 1 + 9 + 125$	$= 1 + 49 + 125$	$= 5 + 1 + 512$
$= 135$	$= 175$	$= 518$

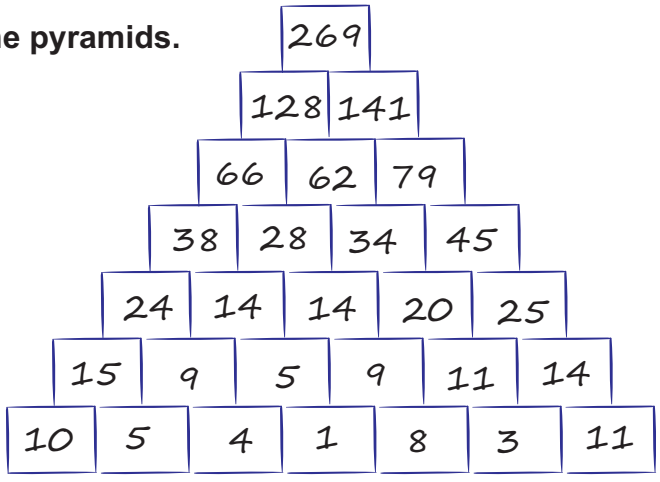
$9 \times 9 = 81$	$3 \times 24 = 72$	$2 \times 47 = 94$	$2 \times 497 = 994$
$9 + 9 = 18$	$3 + 24 = 27$	$2 + 47 = 49$	$2 + 497 = 499$

$12^2 = 144$	$13^2 = 169$	$3^2 + 4^2 = 25$
$21^2 = 441$	$31^2 = 961$	$5^2 = 25$

$10^2 + 11^2 + 12^2$	$13^2 + 14^2$	$2^7 - 1$
$= 100 + 121 + 144$	$= 169 + 196$	$= 128 - 1$
$= 365$	$= 365$	$= 127$

Complete the pyramids.





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Find the totals of these 6 and 10 number Fibonacci Series.

6	3	5	4
4	7	10	7
10	10	15	11
14	17	25	18
24	27	40	29
38	44	65	47
62	71	105	76
100	115	170	123
162	186	275	199
262	301	445	322
682	781	1155	836

11 × 76

2	1	4	1
3	5	8	2
5	6	12	3
8	11	20	5
13	17	32	8
21	28	52	13
52	68	128	32

4 × 8

Fibonacci Totals - A Quick Way - Check your answers.

Find the total of a 10 number Fibonacci by:

multiplying the 7th number in the series by 11.

Find the total of a 6 number Fibonacci by:

multiplying the 5th number in the series by 4.

MAGIC SQUARES

Rows, columns and diagonals add to the same number.

2	7	6
9	5	1
4	3	8

13	5	12
9	10	11
8	15	7

17	10	15
12	14	16
13	18	11

HOW FOUR CAN YOU GO?

Use only four fours

{4, 4, 4, 4}

and +, −, ×, ÷, $\sqrt{}$ or !

Note: $4! = 4\times3\times2\times1$

$\sqrt{4} = 2$

1 = $4 \div 4 + 4 - 4$

2 = $(4 \div 4) + (4 \div 4)$

3 = $(4 + 4 + 4) \div 4$

4 = $(4 - 4) \times 4 + 4$

5 = $(4 \times 4 + 4) \div 4$

6 = $(4 + 4 + 4) \div \sqrt{4}$

7 = $4 + [(4 + \sqrt{4}) \div \sqrt{4}]$

8 = $4 \times 4 \div 4 + 4$

9 = $4 + 4 + 4 \div 4$

10 = $4 \times 4 - 4 - \sqrt{4}$

11 = $44 \div (\sqrt{4} + \sqrt{4})$

12 = $\sqrt{4 \times 4 \times 4} + 4$

13 = $(44 \div 4) + \sqrt{4}$

14 = $4 + 4 + 4 + \sqrt{4}$

15 = $4 \times 4 - (4 \div 4)$

16 = $4 + 4 + 4 + 4$

17 = $(4 \times 4) + (4 \div 4)$

18 = $(44 \div 4) - 4$

19 = $4! - 4 - (4 \div 4)$

20 = $4 \times (4 \div 4 + 4)$

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10A

The Russian Peasant Method of Multiplication

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Put the numbers in two columns.
Double each consecutive number in column 1.
Halve each consecutive number in column 2 (ignore remainders).
Add all the numbers in column 1 that are opposite odd numbers in column 2.

e.g. 15 × 26

~~15~~	26
30	13
~~60~~	6
120	3
240	1
390	

24 × 24

~~24~~	24
~~48~~	12
~~96~~	6
192	3
384	1
576	

31 × 69

31	69
~~62~~	34
124	17
~~248~~	8
~~496~~	4
~~992~~	2
1984	1
2139	

117 × 54

~~117~~	54
234	27
468	13
~~936~~	6
1872	3
3744	1
6318	

Squaring Numbers ending in 5

e.g. 25^2

Multiply the tens digit by 1 greater

$2 \times 3 = 6$

Tack on a 25 $= 625$

Square these numbers.

$15^2 =$ 225
$25^2 =$ 625
$35^2 =$ 1225
$45^2 =$ 2025
$55^2 =$ 3025
$65^2 =$ 4225
$75^2 =$ 5625
$85^2 =$ 7225
$95^2 =$ 9025
$105^2 =$ 11025
$115^2 =$ 13225
$125^2 =$ 15625

3 (+6) 9 (+6) 15

21
27
33
39
45
51

102 (−4) 98 (−4) 94

90
86
82
78

Squaring Numbers in the 50s

e.g. 52^2

Add the ones digit to 25

$2 + 25 = 27$

Square the ones digit and tack it on to the end.

$2^2 = 04$

$= 2704$

Square these numbers.

$50^2 =$ 2500
$51^2 =$ 2601
$52^2 =$ 2704
$53^2 =$ 2809
$54^2 =$ 2916
$55^2 =$ 3025
$56^2 =$ 3136
$57^2 =$ 3249
$58^2 =$ 3364
$59^2 =$ 3481

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Halve these numbers three times.

360 = 180, 90, 45
120 = 60, 30, 15
440 = 220, 110, 55
280 = 140, 70, 35
560 = 280, 140, 70
240 = 120, 60, 30
980 = 490, 245, 122½
404 = 202, 101, 50½
612 = 306, 153, 76½

Multiplying by 5 is the same as multiplying by 10 and halving.

5 × 62 = ½ of 10 × 62
= ½ of 620
= 310

Multiply these numbers by 5.

5 × 28 = 140	43 × 5 = 215
5 × 51 = 255	19 × 5 = 95
5 × 46 = 230	94 × 5 = 470
5 × 77 = 385	22 × 5 = 110
5 × 32 = 160	47 × 5 = 235
5 × 81 = 405	74 × 5 = 370
5 × 53 = 265	33 × 5 = 165
5 × 66 = 330	35 × 5 = 175
5 × 30 = 150	14 × 5 = 70
5 × 99 = 495	41 × 5 = 205
5 × 75 = 375	67 × 5 = 335

DIVISION SET 1

4 ÷ 2 = 2	18 ÷ 6 = 3
66 ÷ 11 = 6	42 ÷ 7 = 6
144 ÷ 12 = 12	120 ÷ 12 = 10
6 ÷ 3 = 2	21 ÷ 7 = 3
55 ÷ 11 = 5	24 ÷ 8 = 3
40 ÷ 8 = 5	27 ÷ 9 = 3
8 ÷ 4 = 2	96 ÷ 12 = 8
54 ÷ 9 = 6	30 ÷ 10 = 3
10 ÷ 5 = 2	16 ÷ 8 = 2
60 ÷ 10 = 6	80 ÷ 10 = 8
90 ÷ 10 = 9	33 ÷ 11 = 3
14 ÷ 7 = 2	84 ÷ 12 = 7
132 ÷ 12 = 11	70 ÷ 10 = 7
48 ÷ 8 = 6	12 ÷ 6 = 2
56 ÷ 8 = 7	36 ÷ 12 = 3
18 ÷ 9 = 2	16 ÷ 4 = 4
88 ÷ 11 = 8	64 ÷ 8 = 8
110 ÷ 11 = 10	20 ÷ 5 = 4
24 ÷ 12 = 2	20 ÷ 10 = 2
63 ÷ 9 = 7	24 ÷ 6 = 4
77 ÷ 11 = 7	22 ÷ 11 = 2
81 ÷ 9 = 9	28 ÷ 7 = 4
121 ÷ 11 = 11	32 ÷ 8 = 4
9 ÷ 3 = 3	36 ÷ 9 = 4
72 ÷ 9 = 8	100 ÷ 10 = 10
72 ÷ 12 = 6	40 ÷ 10 = 4
12 ÷ 4 = 3	44 ÷ 11 = 4
60 ÷ 12 = 5	96 ÷ 12 = 8
15 ÷ 5 = 3	48 ÷ 12 = 4
45 ÷ 9 = 5	25 ÷ 5 = 5
36 ÷ 6 = 6	30 ÷ 6 = 5
50 ÷ 10 = 5	99 ÷ 11 = 9
49 ÷ 7 = 7	35 ÷ 7 = 5

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Increase these numbers by $n^2 + 1$

n	$n^2 + 1$
5	25 + 1 = 17
6	36 + 1 = 27
7	49 + 1 = 50
8	64 + 1 = 65
9	81 + 1 = 82
10	100 + 1 = 101
15	225 + 1 = 226
20	400 + 1 = 401

Increase these numbers by $n^2 - 2$

n	$n^2 - 2$
5	25 - 2 = 23
6	36 - 2 = 34
7	49 - 2 = 47
8	64 - 2 = 62
9	81 - 2 = 79
10	100 - 2 = 98
15	225 - 2 = 223
20	400 - 2 = 398

Increase these numbers by 2n + 8

n	2n + 8
5	10 + 8 = 18
6	12 + 8 = 20
7	14 + 8 = 22
8	16 + 8 = 24
9	18 + 8 = 26
10	20 + 8 = 28
15	30 + 8 = 38
20	40 + 8 = 48

BEMA

$(12 + 3) \times 2$ » 15 × 2 = 30

$5 + 4 \times 6$ » 5 + 24 = 29

$6 + 3 \times 2 + 7$ » 6 + 6 + 7 = 19

$36 - (8 - 6) \times 5$ » 36 - 10 = 26

$18 \div 6 + 5 \times 4$ » 3 + 20 = 23

$6 \times (10 - 2)$ » 6 × 8 = 48

$5^2 \times 4 - 10$ » 100 - 10 = 90

$55 - (10 \times 2^2)$ » 55 - 40 = 15

$[3 \times (4 + 6)] \times 2$ » 30 × 2 = 60

$(5 - 2)^3 - 9$ » 27 - 9 = 18

$(33 + 7) \div (10 \div 5)$ » 40 ÷ 2 = 20

Division Tips - Dividing By Seven

To calculate if a number is divisible by seven, take the last digit, double it, and subtract it from the rest of the number. If THAT number is divisible by seven then so is the original number.

e.g. 231 1 + 1 = 2

23 - 2 = 21

21 is divisible by 7

so 231 is too.

Are these numbers divisible evenly by 7?

228	22 - 16 = 6	Yes	(No)
175	17 - 10 = 7	(Yes)	No
413	41 - 6 = 35	(Yes)	No
607	60 - 14 = 46	Yes	(No)
644	64 - 8 = 56	(Yes)	No
757	75 - 14 = 61	Yes	(No)
847	84 - 14 = 70	(Yes)	No

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Rewrite the equations and calculate the answers.

$(8 \times 12) - (7 \times 12)$ » 96 - 84 = 12

$(4 + 6) \times (8 + 12)$ » 10 × 20 = 200

$(6 \times 9) + (3 \times 9)$ » 54 + 27 = 81

$8^2 - 5^2$ » 64 - 25 = 39

$3^3 + 9^2$ » 27 + 81 = 108

$2 \times (5 + 2)^2$ » 2 × 49 = 98

$(8 - 6)^3 \div (10 - 2^3)$ » 8 ÷ 2 = 4

$[40 \div (3 + 2)]^2$ » [40 ÷ 5]² = 64

Replace the ..... with +, -, ÷ or ×

3 + 15 ÷ 3 = 8

10 - 7 + 15 = 18

8 × 4 - 10 = 22

(18 + 2) ÷ 10 = 2

(10 - 3) ÷ 7 = 1

15 + 3 + 2 - 5 = 15

(18 - 6) × 3 + 2 = 38

32 ÷ (8 ÷ 2) = 8

DIVISION TIPS - Dividing by ninety one

$62 \div 91$ or $\frac{62}{91}$

1. Take the numerator (62) and add the tens unit to it:
   62 + 6 = 68
2. Put a decimal point in front.
   = 0.68
3. Take the units digit of the numerator, subtract 1 and tack that on to the number you have so far:
   = 0.681
4. How far is the first digit (6) from 9?
   Tack the answer on the end.
   = 0.6813
5. How far is the second digit (8) from 9?
   Tack the answer on the end.
   = 0.68131
6. How far is the third digit (1) from 9?
   Tack the answer on the end.
   = 0.681318
7. Keep on doing this process until you have your answer to the required decimal points.

Divide these numbers by 91.

35 ÷ 91
= 0.384615

22 ÷ 91
= 0.241758

19 ÷ 91
= 0.208791

47 ÷ 91
= 0.516483

54 ÷ 91
= 0.593406

88 ÷ 91
= 0.967032

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Complete the tables

n	3n − 6
5	15 − 6 = 9
6	18 − 6 = 12
7	21 − 6 = 15
8	24 − 6 = 18
9	27 − 6 = 21
10	30 − 6 = 24
15	45 − 6 = 39
20	60 − 6 = 54

n	10n + 15
5	50 + 15 = 65
6	60 + 15 = 75
7	70 + 15 = 85
8	80 + 15 = 95
9	90 + 15 = 105
10	100 + 15 = 115
15	150 + 15 = 165
20	200 + 15 = 215

Increase these numbers by $2n^2$

n	$2n^2$
5	2 × 25 = 50
6	2 × 36 = 72
7	2 × 49 = 98
8	2 × 64 = 128
9	2 × 81 = 162
10	2 × 100 = 200
15	2 × 225 = 450
20	2 × 400 = 800

24 CHALLENGE

Write in brackets, +, -, ×, or ÷ to make 24

7 3 3 6 »»» (3 + 7) × 3 − 6 = 24

1 2 3 4 »»» 1 × 2 × 3 × 4 = 24

13 5 8 2 »»» 13 + 5 + 8 − 2 = 24

2 7 8 2 »»» 2 × 7 + 8 + 2 = 24

4 2 3 4 »»» (4 − 2) × (3 × 4) = 24

9 4 5 1 »»» (9 − 4) × 5 − 1 = 24

10 12 6 1 »»» 10 × 12 ÷ (6 − 1) = 24

11 5 9 1 »»» 11 + 5 + 9 − 1 = 24

1 13 10 6 »»» (1 + 13 − 10) × 6 = 24

11 9 9 2 »»» (11 + 9 ÷ 9) × 2 = 24

10 11 6 2 »»» (10 + 11) + 6 ÷ 2 = 24

DICE ARITHMETIC

Get into groups of 2 or 3. Take turns to throw 3 dice. Make up a sum using the 3 numbers and +, -, ×, ÷, √ or !

Fill in your sum below.

$\sqrt{(5 - 1)} + 2 = 4$

$2^2 + 3 = 7$

If you cannot use the numbers on the dice then the first of the other players to come up with a sum gets to put that sum onto their own paper.

The first to have all 10 numbers wins.

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

7 .....

8 .....

9 .....

10 .....

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MIGHTY MATHS NUMERACY PROJECT

CALLING CODE

Using the phone keypad below figure out the names of the following people.

G E
4 3/2 6/3 7/3 4 3/2

= GEORGE

9 4/3 5/3 5/3 7 6/3 9 3/2 7/3

= WILL POWER

7/3 6/3 7/4 3/2 2/2 8/2 7/4 4/2

= ROSE BUSH

9 2 7/3 7/3 3/2 6/2 = WARREN

7 3/2 2 2/3 3/2 = PEACE

SUBTRACTIONS

60 - 21 = 39
68 - 31 = 37
65 - 50 = 15
57 - 23 = 34
41 - 19 = 22
73 - 16 = 57
115 - 69 = 46
83 - 12 = 71
84 - 48 = 36
63 - 50 = 13
66 - 42 = 24
98 - 21 = 77
82 - 64 = 18
51 - 26 = 25
71 - 27 = 44
100 - 38 = 62

DIVISION SET 2

4 ÷ 2 = 2
48 ÷ 4 = 12
81 ÷ 9 = 9
9 ÷ 3 = 3
40 ÷ 4 = 10
12 ÷ 3 = 4
45 ÷ 5 = 9
60 ÷ 6 = 10
10 ÷ 2 = 5
70 ÷ 7 = 10
20 ÷ 4 = 5
25 ÷ 5 = 5
77 ÷ 7 = 11
18 ÷ 3 = 6
24 ÷ 4 = 6
30 ÷ 5 = 6
90 ÷ 9 = 10
36 ÷ 6 = 6
14 ÷ 2 = 7
21 ÷ 3 = 7
28 ÷ 4 = 7
44 ÷ 4 = 11
35 ÷ 5 = 7
16 ÷ 2 = 8
96 ÷ 8 = 12
56 ÷ 7 = 8
84 ÷ 7 = 12
40 ÷ 5 = 8
49 ÷ 7 = 7
64 ÷ 8 = 8
18 ÷ 2 = 9
32 ÷ 4 = 8
54 ÷ 6 = 9
55 ÷ 5 = 11
63 ÷ 7 = 9
120 ÷ 10 = 12
6 ÷ 2 = 3
33 ÷ 3 = 11
72 ÷ 8 = 9
20 ÷ 2 = 10
8 ÷ 2 = 4
30 ÷ 3 = 10
16 ÷ 4 = 4
12 ÷ 2 = 6
80 ÷ 8 = 10
15 ÷ 3 = 5
100 ÷ 10 = 10
22 ÷ 2 = 11
60 ÷ 5 = 12
66 ÷ 6 = 11
50 ÷ 5 = 10
24 ÷ 3 = 8
88 ÷ 8 = 11
24 ÷ 2 = 12
99 ÷ 9 = 11
110 ÷ 10 = 11
121 ÷ 11 = 11
36 ÷ 3 = 12
27 ÷ 3 = 9
72 ÷ 6 = 12
48 ÷ 6 = 8
108 ÷ 9 = 12
42 ÷ 6 = 7
132 ÷ 11 = 12
144 ÷ 12 = 12
36 ÷ 4 = 9

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DIVISION TIPS - Dividing by one hundred and forty three

e.g. 7 divided by 143 $\frac{7}{143}$

1. Multiply the numerator by 7 and subtract 1.
   7 x 7 = 49
   49 - 1 = 48
2. If it is a two digit number put a zero and a decimal point infront.
   = 0.048
3. How far is the first digit (0) from 9?
   Tack the answer on the end.
   = 0.0489
4. How far is the second digit (4) from 9?
   Tack that answer on the end.
   = 0.04895
5. How far is the third digit (8) from 9?
   Tack the answer on the end.
   = 0.048951
6. Keep on doing this process until you have your answer to the required decimal points.

Divide these numbers by 143

29 ÷ 143
= 0.202797

48 ÷ 143
= 0.335664

55 ÷ 143
= 0.384615

77 ÷ 143
= 0.538461

92 ÷ 143
= 0.643356

TABLE MULTIPLICATION

Break up the numbers into easier multiplications then add.

x	10	10	8
10	100	100	80
7	70	70	56

28 x 17 = 280 + 196
= 476

x	10	10	6
10	100	100	60
2	20	20	12

26 x 12 = 260 + 52
= 312

x	10	10	7
10	100	100	70
10	100	100	70
4	40	40	28

27 x 24 = 648

x	10	10	5
10	100	100	50
10	100	100	50
2	20	20	10

25 x 22 = 550

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MIGHTY MATHS NUMERACY PROJECT

Circle the bigger fraction of each pair.

$\frac{10}{12}$ $\frac{1}{3}$ $\frac{5}{8}$ $\frac{8}{12}$ $\frac{7}{8}$ $\frac{3}{4}$

$\frac{1}{2}$ $\frac{1}{12}$ $\frac{5}{8}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{2}{3}$

Write these fractions in order from smallest to largest.

$\frac{1}{2}$ $\frac{1}{12}$ $\frac{1}{3}$ $\frac{5}{8}$ $\frac{10}{12}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{7}{12}$ $\frac{2}{3}$

$\frac{1}{12}$ $\frac{1}{3}$ $\frac{1}{2}$ $\frac{7}{12}$ $\frac{5}{8}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{10}{12}$ $\frac{7}{8}$

Calculate this fraction addition and the equivalent fractions.

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{4}{8} = \frac{6}{12} = \frac{1}{2}$

Over the tens.

38 + 21 = 59
47 + 15 = 62
21 + 19 = 40
35 + 17 = 52
88 + 13 = 101
91 + 16 = 107
97 + 17 = 114
99 + 22 = 121
76 + 30 = 106

Adding in parts.

24 + 9 » 30 + 3 = 33
46 + 6 » 50 + 2 = 52
68 + 5 » 70 + 3 = 73
57 + 9 » 60 + 6 = 66
87 + 8 » 90 + 5 = 95
35 + 7 » 40 + 2 = 42
68 + 6 » 70 + 4 = 74
79 + 4 » 80 + 3 = 83
48 + 3 » 50 + 1 = 51

THE FIBONACCI MINUTE

A Fibonacci series sums each of the previous two numbers.

Step:	1	2	3	4
	1	1	1	1
	2	2	2	2
(1+2=3)»	3	3	3	
(2+3=5)»	5	5		
(3+5=8)»	8			

Time yourself for 1 minute with each of these starting numbers.

1	5
4	6
5	11
9	17
14	28
23	45
37	73
60	118
97	191
157 Very Good!	309
254	500
411	809
665	1309
1076	2118
1741	3427
2817 Excellent!	5545
4558	8972
7375	14517
11933	23489
19308	38006
31241	61495
50549 Amazing!	99501
81790	160996
132339	260497
214129	421493

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METHODS OF MULTIPLICATION

Here is how to multiply numbers close to 100. e.g. 88 × 98.
88 is 12 below 100 and 98 is 2 below 100.
Look at how the product is found then use the method to find the other products.

88 × 98

88 12
× 98 2
8624

2 × 12 = 24
98 − 12 = 86
or 88 − 2 = 86

96 × 93

96 4
× 93 7
8928

92 × 94

92 8
× 94 6
8648

96 × 91

96 4
× 91 9
8736

95 × 91

95 5
× 91 9
8645

73 × 99

73 27
× 99 1
7227

92 × 89

92 8
× 89 11
8188

87 × 89

87 13
× 89 11
7743

MORE METHODS OF MULTIPLICATION

You can break up numbers into easier additions. Look at the method below then find the products.

82
× 9
80 × 9 = 720
2 × 9 = 18
738

97
× 4
90 × 4 = 360
7 × 4 = 28
388

53
× 5
50 × 5 = 250
3 × 5 = 15
265

74
× 6
70 × 6 = 420
4 × 6 = 24
444

68
× 7
60 × 7 = 420
8 × 7 = 56
476

82
× 8
80 × 8 = 640
2 × 8 = 16
656

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MORE METHODS OF MULTIPLICATION

Below is how to quickly multiply numbers that are just a little bigger that 100.

e.g. 103 × 106 = 10918

The answer is in two parts 109 (103 + 6 = 109) and 18 (3 × 6 = 18).

Use this method to quickly find these products.

107 × 101 = 10807	105 × 106 = 11130	103 × 107 = 11021
104 × 104 = 10816	109 × 108 = 11772	101 × 114 = 11514
103 × 102 = 10506	110 × 105 = 11550	102 × 123 = 12546

SUMS OF CONSECUTIVE NUMBERS

Which numbers can be expressed as the sum of consecutive integers?
Some have been completed for you.

2 = not possible
3 = 1 + 2
4 = not possible
5 = 2 + 3
6 = 1 + 2 + 3
7 = 3 + 4
8 = not possible
9 = 4 + 5
10 = 1 + 2 + 3 + 4
11 = 5 + 6
12 = 3 + 4 + 5
13 = 6 + 7
14 = 2 + 3 + 4 + 5
15 = 4 + 5 + 6
16 = not possible
17 = 8 + 9
18 = 5 + 6 + 7
19 = 9 + 10
20 = 2 + 3 + 4 + 5 + 6
21 = 1 + 2 + 3 + 4 + 5 + 6
22 = 4 + 5 + 6 + 7
23 = 11 + 12
24 = 7 + 8 + 9
25 = 12 + 13
26 = 5 + 6 + 7 + 8
27 = 8 + 9 + 10
28 = 1 + 2 + 3 + 4 + 5 + 6 + 7
29 = 14 + 15
30 = 4 + 5 + 6 + 7 + 8
31 = 15 + 16
32 = not possible
33 = 10 + 11 + 12
34 = 7 + 8 + 9 + 10
35 = 17 + 18
36 = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8
37 = 18 + 19
38 = 8 + 9 + 10 + 11
39= 19 + 20
40 = 6 + 7 + 8 + 9 + 10

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MIGHTY MATHS NUMERACY PROJECT

BEMA

$(11 + 9) \times 2$ » 40

$5 + 8 \times 6$ » 53

$6 + 1 \times 2 + 7$ » 15

$66 - (18 - 6) \times 5$ » 6

$18 \div 3 + 8 \times 4$ » 38

$6 \times (23 - 8)$ » 90

$5^2 \times 6 - 20$ » 130

$55 - (5 \times 2^3)$ » 15

$[5 \times (7 + 3)] \times 2$ » 100

$(12 - 8)^3 - 9$ » 55

$(53 + 7) \div (18 \div 9)$ » 30

$3^3 + 2^3 \times 2$ » 43

$(4 + 7)^2 \pm 21$ » 100, 142

$(8 + 2)^2 - (4 + 3)^2$ » 51

$65 - (16 \div 8 \times 2)^2$ » 49

$5 + 5 \times 5^2$ » 130

$[2 \times (5 + 1)] \times 3^2$ » 108

$[2 \times (1 + 2)^2 + 2]^2$ » 400

NUMBER HUNT

+	9	8	12	7	10	4
2	11	10	14	9	12	6
4	13	12	16	11	14	8
1	10	9	13	8	11	5
3	12	11	15	10	13	7
6	15	14	18	13	16	10

×	11	6	5	9	8	4
3	33	18	15	27	24	12
12	132	72	60	108	96	48
5	55	30	25	45	40	20
8	88	48	40	72	64	32
11	121	66	55	99	88	44
6	66	36	30	54	48	24

OVER THE TENS

25 + 7 = 32

56 + 8 = 64

35 + 9 = 44

46 + 5 = 51

97 + 8 = 105

86 + 9 = 95

95 + 26 = 121

98 + 35 = 133

85 + 32 = 117

ADDING IN PARTS

43 + 8 » 50 + 1 = 51

77 + 5 » = 82

59 + 4 » = 63

68 + 9 » = 77

79 + 7 » = 86

34 + 9 » = 43

85 + 6 » = 91

28 + 3 » = 31

57 + 5 » = 62

MORE OVER THE TENS

56 + 39 = 95

37 + 27 = 64

18 + 24 = 42

57 + 37 = 94

28 + 47 = 75

36 + 27 = 63

68 + 28 = 96

33 + 48 = 81

41 + 14 = 55

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METHODS OF MULTIPLICATION

Sometimes the biggest numbers are the easiest to square.
Look at the method below.

96^2 $96 \pm 4 = 100, 92$
$100 \times 92 + 4^2$
$= 9216$

39^2 $39 \pm 1 = 40, 38$
$40 \times 38 + 1^2$
$= 1521$

87^2 $87 \pm 3 = 90, 84$
$90 \times 84 + 3^2$
$= 7569$

14^2 $14 \pm 6 = 20, 8$
$20 \times 8 + 6^2$
$= 196$

18^2 $18 \pm 2 = 20, 16$
$20 \times 16 + 2^2$
$= 324$

37^2 $37 \pm 3 = 40, 34$
$40 \times 34 + 3^2$
$= 1369$

65^2 $65 \pm 5 = 70, 60$
$60 \times 70 + 5^2$
$= 4225$

76^2 $76 \pm 4 = 80, 72$
$80 \times 72 + 4^2$
$= 5776$

98^2 $98 \pm 2 = 100, 96$
$100 \times 96 + 2^2$
$= 9604$

41^2 $41 \pm 9 = 50, 32$
$50 \times 32 + 9^2$
$= 1681$

52^2 $52 \pm 8 = 60, 44$
$60 \times 44 + 8^2$
$= 2704$

69^2 $69 \pm 1 = 70, 68$
$70 \times 68 + 1^2$
$= 4761$

MORE METHODS OF MULTIPLICATION

You can break up numbers into easier additions. Look at the method below then find the products.

		42			33			84
		× 44			× 41			× 76
42 × 40	=	1680	33 × 40	=	1320	84 × 70	=	5880
42 × 4	=	168	33 × 1	=	33	84 × 6	=	504
		1848			1353			6384

		27			44			62
		× 15			× 22			× 34
27 × 10	=	270	44 × 20	=	880	62 × 30	=	1860
27 × 5	=	135	44 × 2	=	88	62 × 4	=	248
		405			968			2108

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MIGHTY MATHS NUMERACY PROJECT

The NZ Centre of Mathematics
mathscentre

Complete these tables.

Add 15 to each.

n	3	5	7	9	11	15	21	25	33	37
n + 15	18	20	22	24	26	30	36	40	48	52

Multiply each by 2 and add 5.

n	2	4	6	8	10	20	28	32	36	44
2n + 5	9	13	17	21	25	45	61	69	77	93

Multiply each number by 3 and subtract 2.

n	5	10	15	20	25	30	35	40	45	50
3n - 2	13	28	43	58	73	88	103	118	133	148

Square each number and then add the number to that square.

n	1	2	3	4	5	6	7	8	9	10
$n^2 + n$	2	6	12	20	30	42	56	72	90	110

Square each number and multiply it by 3.

n	1	2	3	4	5	6	7	8	9	10
$3n^2$	3	12	27	48	75	108	147	192	243	300

Remember total of a 6 number Fibonacci = 5th number × 4.

Multiply by 4 is double and double again

2	1	4	3	5	6
5	9	6	4	10	7
7	10	10	7	15	13
12	19	16	11	25	20
19	29	26	18	40	33
31	48	42	29	65	53
76	116	104	72	160	132

30	2	22
10	18	26
14	34	6

Magic Number = 54

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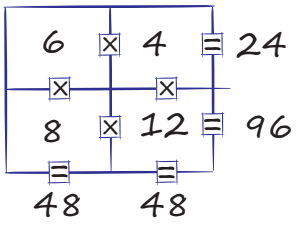
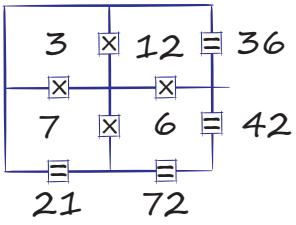
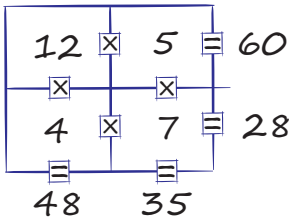
Adding

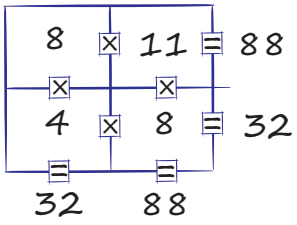
35 + 6 = 41	55 + 19 = 74	65 + 27 = 92
55 + 8 = 63	95 + 16 = 111	85 + 25 = 110
85 + 9 = 94	35 + 18 = 53	45 + 26 = 71
25 + 7 = 32	85 + 17 = 102	35 + 28 = 63
65 + 8 = 73	45 + 15 = 60	25 + 27 = 52
95 + 5 = 100	35 + 17 = 52	35 + 29 = 64
45 + 7 = 52	75 + 18 = 93	55 + 26 = 81
75 + 9 = 84	25 + 16 = 41	75 + 29 = 104
15 + 6 = 21	65 + 19 = 84	95 + 28 = 123

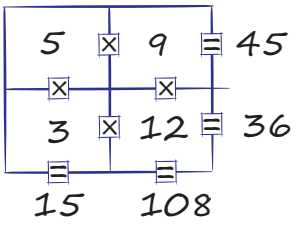
Multiplication squares

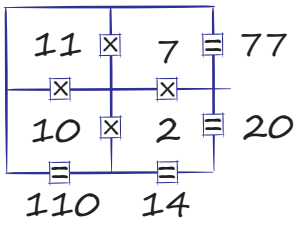












SEQUENCES

+2 +3 +4 +5 +6 +7 +8 +9 +10 +11 +12 +13

0, 2, 5, 9, 14, 20, 27, 35, 44, 54, 65, 77, 90

-1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12

150, 149, 147, 144, 140, 135, 129, 122, 114, 105, 95, 84, 72

+14 +13 +12 +11 +10 +9 +8 +7 +6 +5 +4 +3

1, 15, 28, 40, 51, 61, 70, 78, 85, 91, 96, 100, 103

-14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3

120, 106, 93, 81, 70, 60, 51, 43, 36, 30, 25, 21, 18

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MAHOBE

NUMERACY PROJECT

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