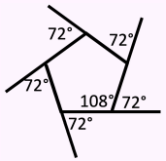
MATHS KNOWLEDGE ORGANISER - YEAR 6

Shape

Polygons n = number of sides

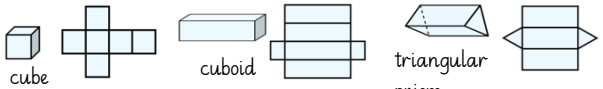
n	Sum of interior angles
3 – triangle	1 x 180° = 180°
4 – quadrilateral	2 x 180° = 360°
5 – pentagon	3 x 180° = 540°
6 – hexagon	...
7 – heptagon	...
8 – octagon	(n-2) x 180°
9 – nonagon	...
10 – decagon	...

Exterior angles sum to 360°



Angles on a line sum to 180°

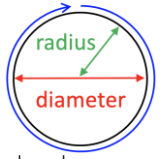
Nets of 3D shapes



Quadrilaterals

Square, Parallelogram, Rectangle, Trapezium, Rhombus, Kite

Circles



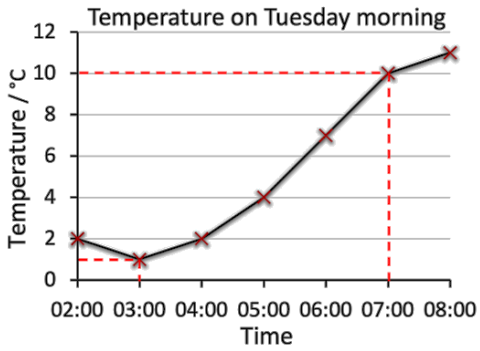
d = 2r

Triangles

Isosceles, Equilateral, Scalene

Tables and Graphs

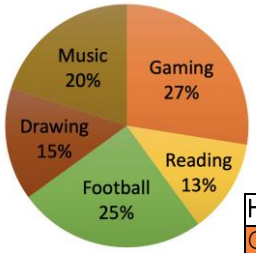
Line graph



Difference in temperature at 3 am and 7 am = 9°C

Pie Chart

Favourite Hobbies



Angle per person = 360° ÷ 40 = 9°

Hobby	Frequency	Angle
Gaming	11	99°
Reading	5	45°
Football	10	90°
Drawing	6	54°
Music	8	72°
Total	40	360°

Mean

The mean is also called the average

Find the mean time taken to walk to school.

Day	Time
Monday	15 mins
Tuesday	10 mins
Wednesday	12 mins
Thursday	10 mins
Friday	11 mins

Add the individual times and divide by how many there are

15 + 10 + 12 + 10 + 11 = 58

58 ÷ 5 = 11.6 minutes

Algebra

Find missing numbers represented by letters

a + 5 = 10

10	
5	a

a = 5

b – 11 = 21

b	
11	21

b = 32

Two unknowns: x + y = 3

Possible solutions

x = 0 x = 1 x = 2 x = 3

y = 3 y = 2 y = 1 y = 0

Sequences

n	term	
1	2	
2	5	+ 3
3	8	+ 3
4	11	+ 3
5	14	+ 3

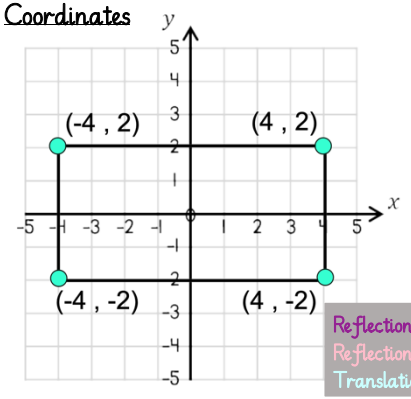
+3 ⇨ 3n

1st term: 3 x 1 – 1 = 2

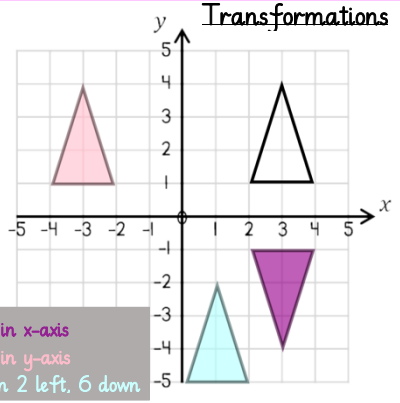
2nd term: 3 x 2 – 1 = 5

nth term = 3n – 1

Coordinates



Transformations



Reflection in x-axis

Reflection in y-axis

Translation 2 left, 6 down

Measure

Length

1 km = 1000 m

1 m = 100 cm

1 cm = 10 mm

Mass

1 kg = 1000 g

1 tonne = 1000 kg

Volume

1 l = 1000 ml

1 cl = 10 ml

Time

1 year = 365 days

1 day = 24 h

1 h = 60 min

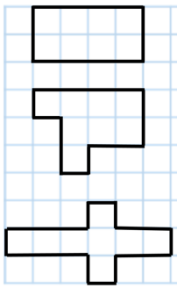
1 min = 60 s

Large units

x ÷

Small units

Area and Perimeter



A = 8 P = 12

A= 8 P=14

A=8 P=18

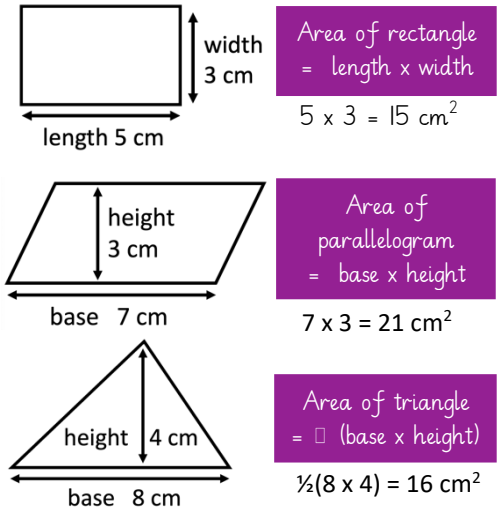
Same area, different perimeter

Imperial measures

1 mile = 1.6 km or 8 km = 5 miles

A litre of water's a pint and three quarters

1 kg = 2.2 pounds (lb)



Area of rectangle = length x width

5 x 3 = 15 cm²

Area of parallelogram = base x height

7 x 3 = 21 cm²

Area of triangle = ½ (base x height)

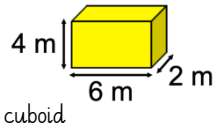
½(8 x 4) = 16 cm²

Volume

Volume of cuboid = length x width x height

cube

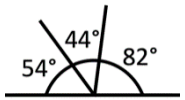
5 x 5 x 5 = 125 cm³



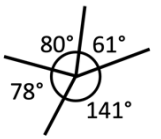
cuboid

6 x 2 x 4 = 48 cm³

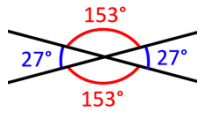
Angles



Angles on a straight line add up to 180°

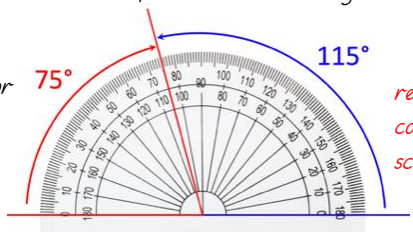


Angles round a point add up to 360°



Where 2 lines intersect, opposite angles are equal

Using a protractor



read the correct scale

MATHS KNOWLEDGE ORGANISER - YEAR 6

Place Value

Hundred Millions	Ten Millions	Millions	Hundred Thousand	Ten Thousand	Thousand s	Hundreds	Tens	Ones
2	1	2	9	3	5	1	7	8

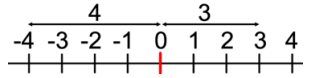
212 935 178 = 200 000 000 + 10 000 000 + 2 000 000 + 900 000 + 30 000 + 5 000 + 100 +70 + 8

Naming numbers

216,935,178 Two hundred and twelve million, nine hundred and thirty-five thousand, one hundred and seventy-eight

900 000 502 Nine hundred million, five hundred and two

Negative numbers



3 > -4 -4 < 3

Difference between -4 and +3 = 7

Difference is always positive.

Adding and subtracting

-4 ++ 3 = -4 + 3 = -1

-4 - +3 = -4 - 3 = -7

-4 + -3 = -4 – 3 = -7

-4 - -3 = -4 + 3 = -1

Addition

£2.95 + 54p + 89p

2.95 *altogether*
0.54 *add*
+ 0.89 *sum*
£ 4.38 *total*

Subtraction

5 6 0 1
- 9 5 5
4 6 4 6

take away
difference
less than
minus
how many more?

Order of operations

Brackets
Indices
Divide / Multiply } *Do in the order they appear*
Add / Subtract } *Do in the order they appear*

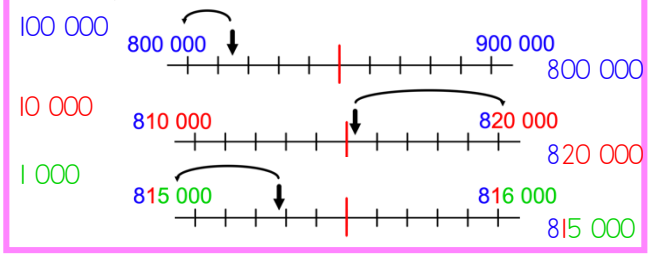
5 + 6 x 7 + 2 = 5 + 42 +2 = 49

(5 + 6) x 7 + 2 = 11 x 7 + 2
= 77 + 2
= 79

16 – 6 ÷ 2 + 3 = 16 – 3 + 3
= 16

15 + (6 ÷ 2 x 3) - 9 = 15 + 9 - 9
= 15

Rounding *815 279 to the nearest*



I = 1
V = 5
X = 10
L = 50
C = 100
D = 500
M = 1000

Roman numerals

Example

1999			
1000	900	90	9
M	CM	XC	IX
MCMXCIX			

Factors

Multiply together to give a product.

Factors of 12	Factors of 20
1, 2, 3, 4, 6, 12	1, 2, 4, 5, 10, 20

Common factors: 1, 2, 4
Highest common factor: 4

Multiples

All the products of a number multiplied by integers

Multiples of 8	Multiples of 10
0, 8, 16, 24, 32, 40, 48...	10, 20, 30, 40, 48...

Lowest common multiple: 40

Prime numbers

2 factors (1 and itself)
7 is prime

Composite number:
more than 2 factors
8 is composite

1 is neither prime nor composite – it only has 1 factor

Multiply and divide

Multiply by 2 digits

475 x 37 = 14250 + 17575

12.36 x 24 = 49.44 + 247.20 + 296.64

Long division

01397
16 | 22352

16 x 1 = 16000 - 6352
16 x 3 = 4800 - 1552
16 x 9 = 1440 - 112
16 x 7 = 112 - 0

1	16
2	32
3	48
4	64
5	80
6	96
7	112
8	128
9	144
10	160
11	176
12	192

Short division

6 | 12345 2 = 02057

Remainders as fractions or decimals

4 | 531 = 132r3
4 | 531 = $132\frac{3}{4}$
4 | 531.00 = 132.75

Multiply and divide by 10, 100, 1000

	Th	H	T	O	.	1/10	1/100
				0	.	5	2
x 100			5	2	.		
	1	2	6	0	.		
÷ 1000				1	.	2	6

Digits move to the left

Digits move to the right

Equivalent fractions

Simplify:

$\frac{75}{200} \overset{\div 25}{=} \frac{3}{8}$

divide numerator and denominator by highest common factor

Make same denominator:

$\frac{1}{6} \overset{\times 7}{=} \frac{7}{42}$ $\frac{1}{7} \overset{\times 6}{=} \frac{6}{42}$

multiply numerator and denominator by lowest common multiple

Addition and subtraction

$\frac{5}{8} + \frac{1}{4} = \frac{5}{8} + \frac{2}{8} = \frac{7}{8}$

$\frac{1}{3} - \frac{1}{9} = \frac{3}{9} - \frac{1}{9} = \frac{2}{9}$

Ensure the fractions have the same denominator

Multiplication

$\frac{5}{8} \times \frac{1}{4} = \frac{5 \times 1}{8 \times 4} = \frac{5}{32}$

$3 \times \frac{2}{7} = \frac{3}{1} \times \frac{2}{7} = \frac{6}{7}$

Write whole numbers as a fraction over 1

Fractions

Converting

Percentage to decimal to fraction

30% = 0.30 = 3/10
3% = 0.03 = 3/100
33% = 0.33 = 33/100

Decimal to percentage to fraction

0.7 = 70% = 7/10
0.07 = 7% = 7/100
0.77 = 77% = 77/100

Fraction to decimal to percentage

3/5 = 60/100 = 0.6 = 60%
7/8 = 7 ÷ 8

8 | 7.000 = 0.875 = 87.5%

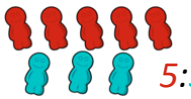
Division

Invert and multiply

$\frac{5}{8} \div 4 = \frac{5}{8} \times \frac{1}{4} = \frac{5}{32}$

$\frac{2}{7} \div \frac{1}{3} = \frac{2}{7} \times \frac{3}{1} = \frac{6}{7}$

Ratio



5:3

For every 5 red there are 3 blue

Red	Blue	Total
5	3	8
10	6	16
20	12	32
250	150	400
2000	1200	3200

The ratio of red to blue stays the same

Fractions of amounts

¾ of 2000

2000			
500	500	500	500

Find ¼ 2000 ÷ 4 = 500
Find ¾ 500 x 3 = 1500

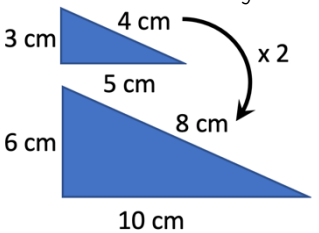
Percentages of amounts

100%	£500
10%	£50
1%	£5
20%	£100
3%	£15

23% of £500
23% = 20% + 3%
= 100 + 15
= £115

Similar triangles

Enlargement scale factor 2



The ratio of the side lengths stays the same.

Equivalents

¼ = 0.25 = 25%
½ = 0.5 = 50%
¾ = 0.75 = 75%
1/10 = 0.1 = 10%