

Year 5 Maths Knowledge Organisers

Spring



Week 1	Week 2	Week 3	Week 4	Week 5		Week 1	Week 2	Week 3	Week 4	Week 5
4OPS <u>Place value</u> <u>+ & -</u> <u>X & ÷</u>	<u>Statistics</u>	<u>Geometry 1</u> <u>Geometry 2</u>		<u>Time</u>	Half term	<u>Time</u>	<u>Area, perimeter and volume</u>		<u>Measurement</u>	



Vocabulary

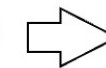
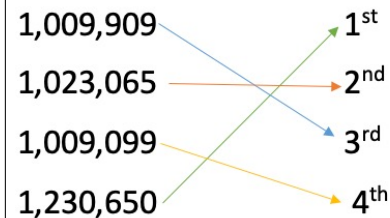
- 1 more
- 1 less
- Greater than
- Less than
- Equal
- Equivalent
- Millions
- Thousands
- Hundreds
- Tens
- Ones
- Zero
- Place Value
- Order
- Round
- Negative
- Number
- Digit

More or Less

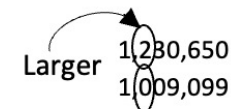
	+1,000
Number	1,000 more
4,600	5,600
6,643	7,643
8,021	9,021
	-1,000

Ordering

Order from largest to smallest



- Look at the largest digit first (millions)
- Same { 1,230,650
1,009,099 }
- Then go to the next digit. If the digit is greater, then the number is larger



Place Value

Y5/6



Rounding

Round 3,576,219 to the nearest million

Identify the millions

3,576,219

Look at the digit beside the millions

Rounding rhyme – 0,1,2,3,4 stays the number before

5,6,7,8,9 rounds up on the number line

So, rounding 3,576,219 to the nearest million will mean it will round up on the number line because of the 5 digit in the hundred thousands.

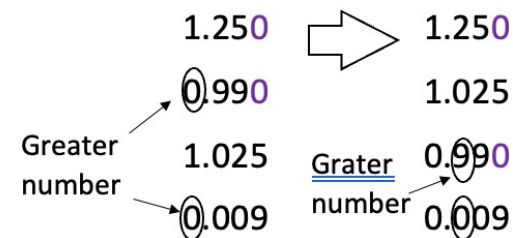
4,000,000

Ordering Decimals

Order starting with the smallest

1.25 0.99 1.025 0.009

Add place holders (write zeros) and follow the steps above



Roman Numerals

I = 1

Value = 5

Xylophones = 10

Like = 50

Cows = 100

Do = 500

Milk = 1000

• Bridging numbers

V, L and D (you can't have 2 together)

• Top rule – you cannot have more than 3 of the same letter in a row

MM XXIII

MMXXIII = 2023

Recognise value of digits

What is the value of 4?

1,042,851

Move from the ones across writing the value of the column above

M	H	T	Th	H	T	O
1	0	4	2	9	5	1

Forty thousand

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Vocabulary

- Add
- Plus
- Total
- Sum
- Altogether
- Equals
- Digit
- Tens
- Ones
- Hundreds
- Subtract
- Minus
- Take away
- Regroup

Add and subtract mentally

1. 3 digit and ones

Circle the ones and subtract

$$\begin{array}{r} 384 - 3 = 381 \\ 4 - 3 = 1 \end{array}$$



2. 3-digits and tens

Circle the tens and add

$$\begin{array}{r} 839 + 60 = 899 \\ \underline{3 + 6 = 9} \end{array}$$

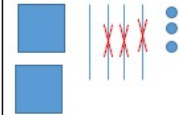
3. 3-digit and hundreds

Circle the hundreds

$$\begin{array}{r} 649 - 400 = 249 \\ 6 - 4 = 2 \end{array}$$

Prove all with resources and drawings in school. E.g.

$$243 - 30 = 213$$



Column addition

example

	4	5	8	6	4
+	2	3	4	9	7
	6	9	3	6	1
	1	1	1		

Column addition (without regrouping)

$$241 + 52 = 293$$

- Write in a column
- Make sure each digit is in the correct column

Wrong column as fifty should be in the tens column

H	T	O
2	4	1
	5	2
<hr/>		

❖ Start with the ones.

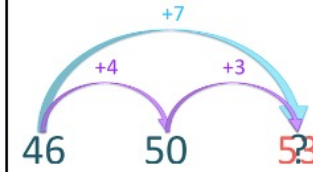
$$1 + 2 = 3$$

❖ Then go to the tens.

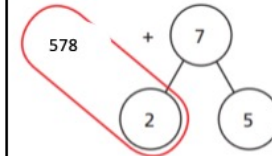
$$\begin{array}{r} 241 \\ + 52 \\ \hline 293 \end{array}$$

Mental addition and subtraction bridging

$$46 + 7 = 53$$



❖ Get to the next ten or hundred and then add the rest.



E.g. $394 - 40 =$
 $404 + 30 = 434$

Addition and subtraction Y5/6



Column addition (with regrouping)

$$2482 + 3138 = 620$$

- Start with ones, $2 + 8 = 10$
So regroup by carrying
The 1 to the tens column
- $8 + 3 + 1 = 12$
Don't forget to add the 1
That you regrouped!
- $4 + 1 + 1 =$

4. Add the Ths

Th	H	T	O
2	4	8	2
+	3	1	3
<hr/>			
5	6	2	0

Apply with greater numbers up to 1

Column subtraction example

	3	5	7 ⁶	4 ¹³	2 ¹
-		3	4	7	6
	3	2	2	6	6

Column subtraction (with regrouping)

$$875 - 287 = 589$$

- Start with ones, $5 - 7$, you cannot do so regroup by taking one ten from the 7, leaving 6 tens, and put in the ones column to make 15. $15 - 6 = 9$
- Next, the tens. $6 - 8$, you cannot do so regroup by taking one of the hundreds, leaving 7 hundred, and put it in the tens column to make 16. $16 - 8 = 8$
- Finally, $7 - 2 = 5$

H	T	O
8	7	5
-	2	8
<hr/>		
5	8	9

You cannot do $5 - 7$ so go to the tens column. Take a ten to leave 6 tens and make 15 in the ones column.



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Vocabulary

- Multiply
- Multiplication
- Lots of
- Times
- Division
- Grouping
- Sharing
- Arrays

Short division

$$217 \div 7 = 31$$

1. This division is quicker because you are dividing by a times table up to 12. This example is dividing by 7.
2. Write in a bus stop

$$\begin{array}{r} 7 \overline{)217} \end{array}$$

3. Look at the first digit in 217. How many 7s are in 2? Zero.

$$\begin{array}{r} 0 \\ 7 \overline{)217} \end{array}$$

4. Look at the next digit with the 2. How many 7s in 21? Three.

$$\begin{array}{r} 031 \\ 7 \overline{)217} \end{array}$$

5. How many 7s in 7? One.

Highest common factor (HCF)

What is a factor?

- A factor is a number that goes into another number.
- LCF is when you compare 2 or more numbers, list their factors and identify what factor is common between them. The highest value is the HCF.

Top tip – list the factors as pairs and start from 1, then go to 2, 3, etc.

Factors for 16	
1	16
2	8
4	4

Factors for 12	
1	12
2	6
3	4

What is the HCF for 16 and 12?

4 is the HCF.

2 is a common factor but it isn't the highest.

Order of operations

Remember **BODMAS**

B – brackets

O – orders (squared or cubed)

D – division

M – multiplication

A – addition

S – subtraction

Follow this order to complete calculations correctly.

E.g. $(16-10) \div 3 = ?$

1. Brackets 1st, so $16-10=6$

2. Then, $6 \div 3 = 2$

So, $(16-10) \div 3$ equals 2.

Apply times tables

If you know $2 \times 8 = 16$, then you know...

$$2 \times 8 = 16$$

$$20 \times 8 = 160$$

$$2 \times 80 = 160$$

20 has a 0 so your answer will have 1 zero as it is 10x greater

Top tip – look at the number of zeros. This tells you if you need to write any zeros in your answer.

$$20 \times 80 = 1600$$

In total, 20 and 80 have 2 zeros so the answer will have 2 zeros as it is 100x greater

Column multiplication

$$324 \times 13$$

1. Write the calculation in a column. Make sure the digits are in the correct column.

e.g. **HTO**

$$\begin{array}{r} 324 \\ \times 13 \\ \hline \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline \end{array}$$

2. Start with multiplying the 3 in 13 with the ones column. So, $3 \times 4 = 12$. Carry the 1 in the number 12 into the tens column.

3. Move onto 3×2 (the tens column) and **add the extra 1** that you carried. $3 \times 2 = 6$, add $1 = 7$

4. Then, 3×3 (in the hundreds column), which is 9

5. You have multiplied the 3 in 13, now move onto the 1 ten in 13.

6. Put a zero (0) in the ones column as we are x by 10 not 1.

7. Then follow the same process described in the previous Steps but multiplying each digit by 1 instead ($1 \times 4, 1 \times 2, 1 \times 3$)

8. Finally, $972 + 3240 = 4212$. Use the column method (see the addition and subtraction KO for support)

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline 972 \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline 972 \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline 972 \\ + 3240 \\ \hline 4212 \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline 972 \\ + 3240 \\ \hline 4212 \end{array}$$

HTO

$$\begin{array}{r} 324 \\ \times 13 \\ \hline 972 \\ + 3240 \\ \hline 4212 \end{array}$$

Multiplication and division Y5/6



Long division

$$6786 \div 29 = 234$$

$$\begin{array}{r} 29 \overline{)6786} \end{array}$$

1. You don't know the 29x table? Calculate the first 5 numbers in the 29x table by adding 29 five times.

1x	29	58	87	116	145
	+29	+29	+29	+29	+29
2x	58	87	116	145	174

$$\begin{array}{r} 0 \\ 29 \overline{)6786} \end{array}$$

How many 29s in 67? Zero. So go to the next digit to make 67 and write 0.

$$\begin{array}{r} 023 \\ 29 \overline{)6786} \end{array}$$

How many in 98? Three. $98-87=11$

Important facts

Anything $\times 0$ is always 0 as you do not have any groups.

$$\begin{array}{r} 02 \\ 29 \overline{)6786} \end{array}$$

How many 29s in 67? Use your notes to help. Two times. $67-58=9$. Carry the 9 to the next column.

$$\begin{array}{r} 0234 \\ 29 \overline{)6786} \end{array}$$

How many 29s in 116? Four times.

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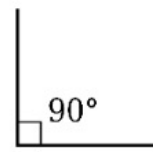
Vocabulary

- Angle
- Right Angle
- Acute Angle
- Obtuse Angel
- Reflex Angle
- Triangle
- Isosceles Triangle
- Scalene Triangle
- Right Angled Triangle
- Equilateral Triangle
- Diameter
- Vertically opposite
- Angles

[Click here for Shape 2](#)

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The Angles



Right Angles are 90°



Obtuse angles are greater than 90° but less than 180°

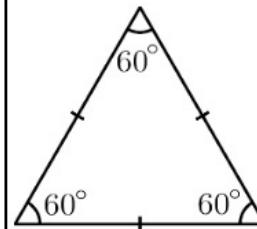


Acute angles are less than 90°



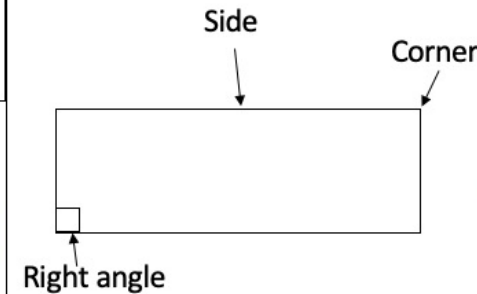
Reflex angles are greater than 180°

Angles in a triangle add up to 180°

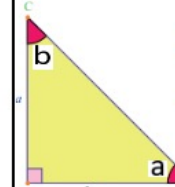


$$60^\circ \times 3 = 180^\circ$$

Labelling a 2D shape

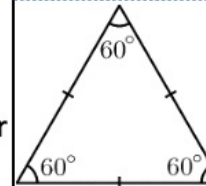


Different triangles



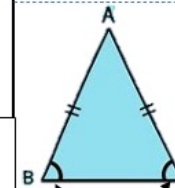
Right angled triangle

1. It has an angle measuring 90° , which is shown by the square
2. The other 2 angles add up to 90° ($a + b = 90^\circ$)



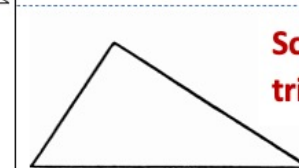
Equilateral triangle

1. All angles are 60°
2. All sides are the same



Isosceles triangle

1. Two angles are equal
2. Two lengths are equal



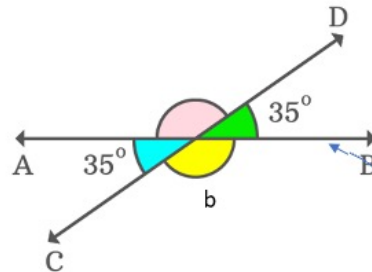
Scalene triangle

1. All angles are different
 2. All lengths are different
- * Remember all angles in a triangle add up to 180° !

Vertically opposite angles

Vertically opposite angles are always the same

e.g.



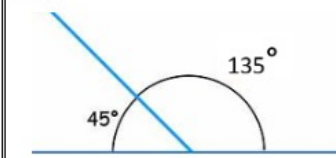
1. If one side is 35° then the other side is 35°
2. 35° and b are on a straight line so have a total of 180° altogether. Subtract 35 from 180° to find b .
 $180^\circ - 35^\circ = 145^\circ$

Shape Y5/6

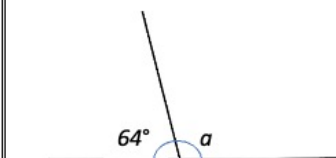
(Part 1)



Angles on a straight line add up to 180°



$$135^\circ + 45^\circ = 180^\circ$$

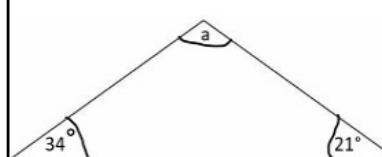


If there is a missing angle, subtract the angles you know from 180°

$$180^\circ - 64^\circ = 116^\circ$$

$$a = 116^\circ$$

Finding missing angles

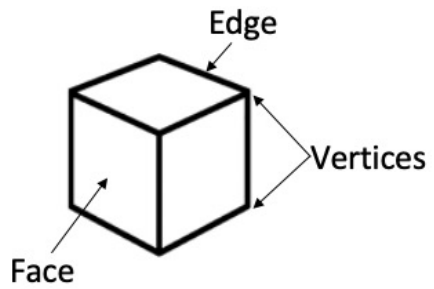


1. Add together the angles you know
 $34^\circ + 21^\circ = 55^\circ$
2. Subtract this total from 180
 $180^\circ - 55^\circ = 125^\circ$
 $a = 125^\circ$

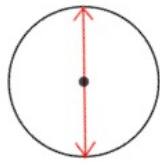
Vocabulary

- 3D shapes
- Cube
- Cuboid
- Sphere
- Square based pyramid
- Tetrahedron
- Triangular prism
- Vertices
- Edges
- Faces
- Angles
- Degrees
- Radius
- Diameter
- Volume

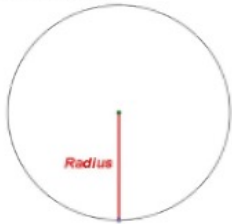
Parts of a 3D shape



Radius and diameter

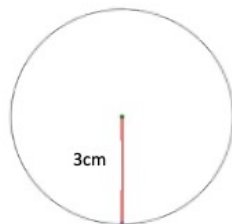


Diameter is the distance from one side of the circle to the opposite side of the circle.

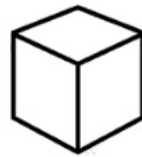


Radius is the distance from the middle of the circle to the side.

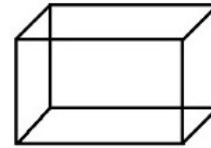
The diameter is twice as long as the radius



Radius = 3cm
Diameter = 6 cm

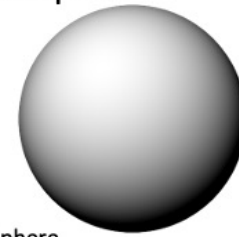


Cube
Faces = 6
Vertices = 8
Edges = 12

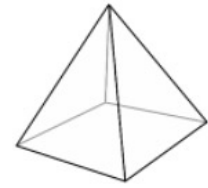


Cuboid
Faces = 6
Vertices = 8
Edges = 12

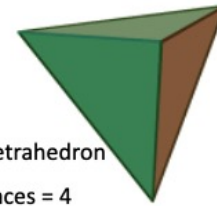
Shapes



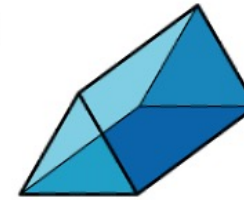
Sphere
Faces = 1
Vertices = 0
Edges = 0



Square based pyramid
Faces = 5
Vertices = 5
Edges = 8



Tetrahedron
Faces = 4
Vertices = 4
Edges = 6



Triangular prism
Faces = 5
Vertices = 6
Edges = 9

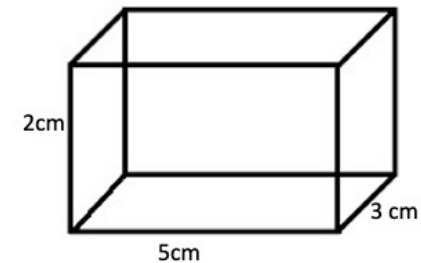
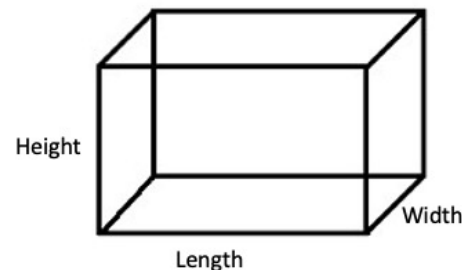
Shape Y6 (Part 2)

Volume

Volume is the 3D space something can hold

Volume = length x width x height

The units in volume always end in ³ for cubed (e.g. cm³)



$$5 \times 3 \times 3 = 12\text{cm}^3$$
$$6 \times 2 = 12\text{cm}^3$$



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Vocabulary

- Fraction
- Part
- Whole
- Equal
- Share
- Half
- Quarter
- Third
- Equivalent
- Numerator
- Denominator
- Proper Fraction
- Improper Fraction
- Factor
- Highest Common Factor
- Lowest Common Multiple
- Simplify
- Simplest Form
- Mixed Number
- Whole Number

Add Fractions

$$\frac{4}{5} + \frac{2}{3}$$

1. Find a common multiple of 5 and 3

e.g. $\frac{15}{5}$

$$x3 \left(\frac{4}{5} + \frac{2}{3} \right) x5$$

$$\left(\frac{12}{15} + \frac{10}{15} \right) x5$$

Whatever you do to the top you must do to the bottom

3.

$$x3 \left(\frac{4}{5} + \frac{2}{3} \right) x5$$

$$x3 \left(\frac{12}{15} + \frac{10}{15} \right) x5$$

$$= \frac{22}{15}$$

Subtract fractions

Lowest common multiple

8=8,16,24,32,40

5=5,10,15,20,25,30,35,40

$$\frac{7}{8} - \frac{3}{5}$$

$$x5 \left(\frac{35}{40} - \frac{24}{40} \right) x8 = \frac{11}{40}$$

Divide fractions

$$\frac{4}{7} \div \frac{2}{5}$$

Stay Change Flip

$$\frac{4}{7} \times \frac{5}{2} = \frac{20}{14}$$

$$= 1 \frac{6}{14}$$

$$= 1 \frac{3}{7}$$

Multiply Fractions

$$\frac{5}{8} \times \frac{3}{5}$$

Times the top AND times the bottom

$$\frac{5 \times 3}{8 \times 5}$$

$$= \frac{15}{40}$$

Fractions

Y6

$$\frac{5}{7}$$

Numerator

Denominator



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

$$\frac{2}{5} \text{ Of } 15$$

Divide by the bottom

Times by the top

$$15 \div 5 = 3$$

$$3 \times \underline{2} = 6$$

$$\frac{2}{5} \text{ Of } 15 = 6$$

Mixed number \rightarrow Improper Fractions

2 $\frac{3}{5}$ 1. Multiply whole number by the denominator

$$2 \times 5 = 10$$

2. Add the number to the answer

$$10 + 3 = 13 = \frac{13}{5}$$

Lowest common multiples

8 = 8,16,24

12 = 12,24

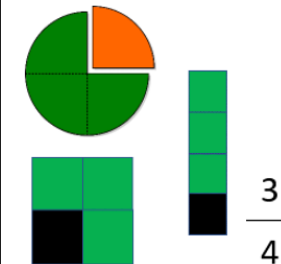
$$\frac{3}{8} + \frac{5}{12}$$

$$x3 \left(\frac{9}{24} + \frac{10}{24} \right) x2 = \frac{19}{24}$$

Common denominator = find another number that the bottom number (denominator) multiplies into.

e.g. $\frac{3}{6} = \frac{6}{12}$ (multiplied by 2)

$\frac{4}{5} = \frac{16}{20}$ (multiplied by 4)



Multiply fraction by whole number

$$\frac{2}{5} \times 3$$

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

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

Improper fractions \rightarrow mixed fractions

$$\frac{17}{3}$$

1. How many 3s in 17?

$$5 \underline{3} (3 \times 5 = 15)$$

$$5 \frac{17-15}{3}$$

Subtract 15 from 17

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

Divide fraction by whole number

$$\frac{5}{7} \div 3$$

Turn whole number into fraction so $3 = \frac{3}{1}$

$$\frac{5}{7} \div \frac{3}{1}$$

Stay Change Flip

$$\frac{5}{7} \times \frac{1}{3} = \frac{5}{21}$$



Click here to return to selection page

Vocabulary

- Bar chart
- Pictogram
- Frequency table
- Tally chart
- Pie chart
- Discrete data
- Continuous data
- Line graph
- Sum
- Difference
- Comparison
- Interpret
- Mean
- Average

Statistics Y5/6



Tables and tally charts

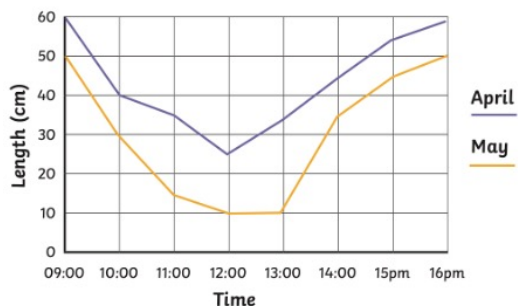
Method of Travel	Tally	Frequency
Walk		9
Bike		3
Car		6
Bus		12
TOTAL		30

Line graph

Line graphs are used to show changes to a measurement over time.

It is used for continuous data (numbers that are not fixed).

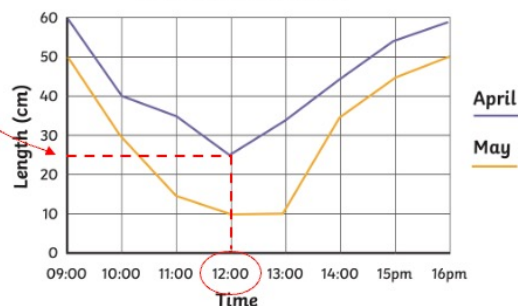
A line graph to show the length of shadows over time



To find values on a line graph, your child must use a ruler to draw lines to find the corresponding value.

For example, what time was the length of the shadow 25cm during April?

A line graph to show the length of shadows over time

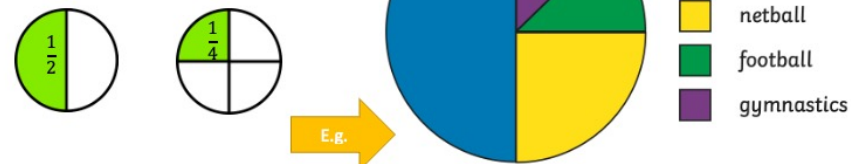


Mean is when you add up all the values and divide it by the total number of values.

Pie charts

Children should use what they know from previous years.

A pie chart to show children's favourite sports



Use these fractions and the total to find out different values

24 children were asked in total.

Swimming = $\frac{1}{2}$ so $\frac{1}{2}$ of 24 = 12 children

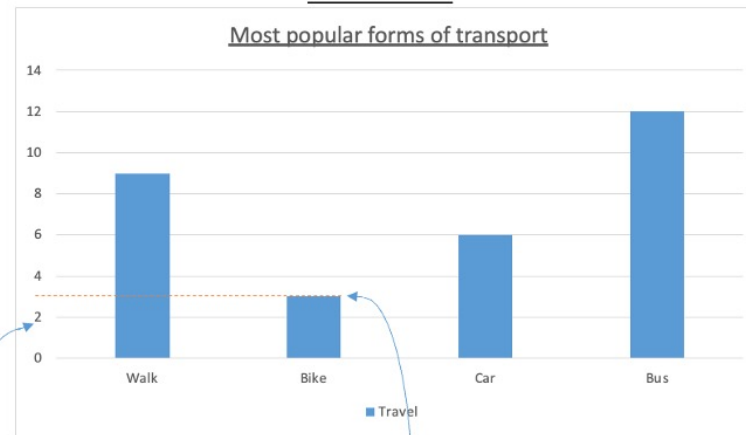
Netball = $\frac{1}{4}$ so $\frac{1}{4}$ of 24 = 6 children

Football = $\frac{1}{8}$ so $\frac{1}{8}$ of 24 = 3 children

Gymnastics = $\frac{1}{8}$ so $\frac{1}{8}$ of 24 = 3 children

Bar chart

Most popular forms of transport



Scale (counting in 2s)

- To interpret a bar chart, children must draw a line to check the value of a bar.
- To draw a bar chart, the children must decide on a suitable scale, make sure the bars are an equal distance apart and the same thickness.

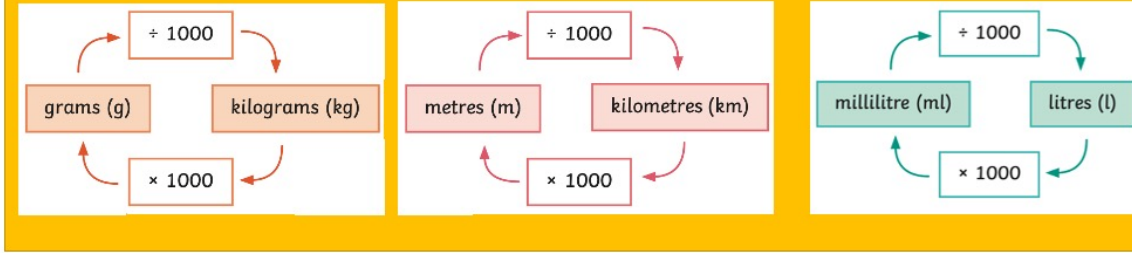
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Vocabulary

- Measure
- Compare
- Add
- Subtract
- Mass
- Volume
- Millilitres (ml)
- Litres (l)
- Kilograms (kg)
- Grams (g)
- Metres (m)
- Centimetres (cm)
- Millimetres (mm)
- Perimeter
- Time
- Analogue
- Digital
- Hours
- Minutes
- Seconds
- O'clock
- Half past
- Quarter past/to
- Midday
- Am and pm

Conversion

The 1000 club!!!



Kilo = 1000

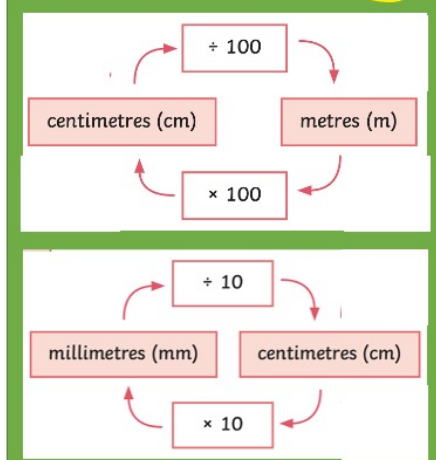
Children learn what the 1000 club is which means you always multiply or divide by 1000.

$$3600\text{g} = 3.6\text{kg} \quad 3421\text{m} = 3.421\text{km} \quad 342\text{cm} = 3.42\text{m}$$

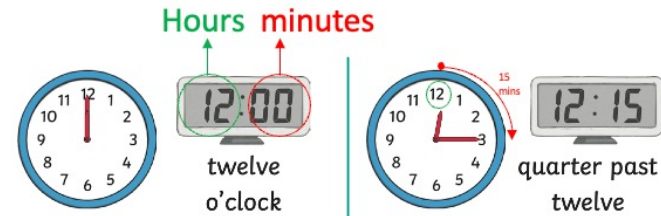
$$4521\text{g} = 4.521\text{kg} \quad 9465\text{m} = 9.465\text{km} \quad 2837\text{cm} = 2.837\text{m}$$

Conversion and
time
Y5/6

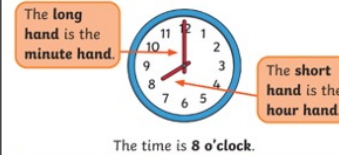
The sad club ☹️



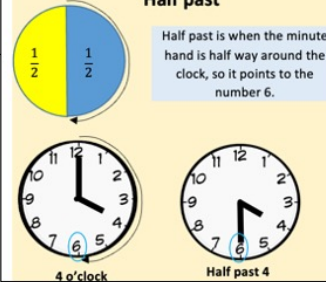
Digital and analogue



Telling the time - o'clock

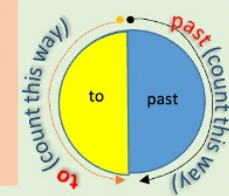


Half past

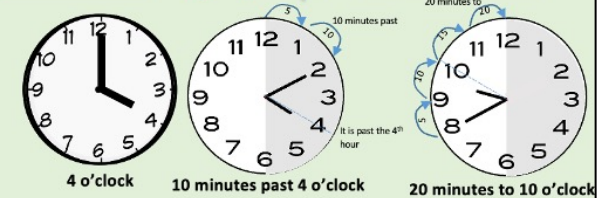


Past and to (5 minute intervals)

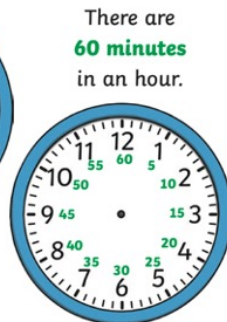
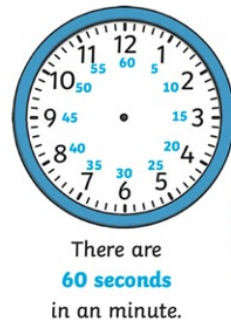
When the minute hour is on this side, you count to see how many minutes it is until the next hour (count this way from 12)



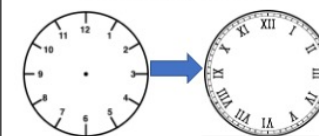
When the minute hour is on this side, you count to see how many minutes it is past the last hour (count in 5s this way from 12)



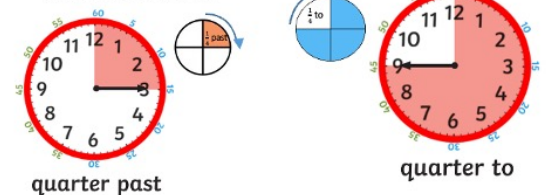
How we measure time?



Roman numerals



Quarter past and to

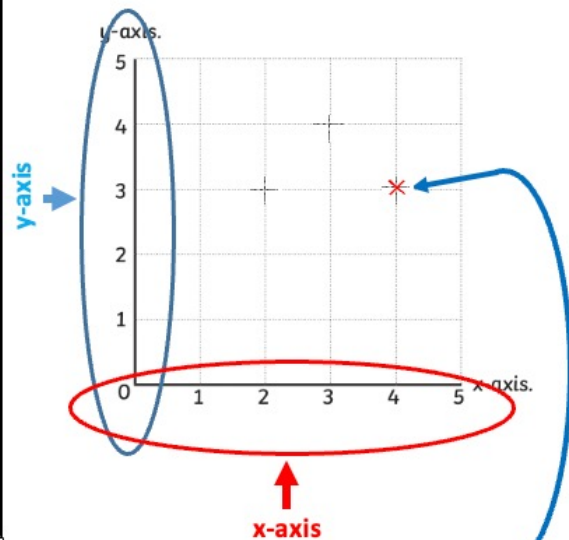


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Vocabulary

- X-axis
- Y-axis
- Coordinate
- Quadrant
- Reflection
- Mirror line
- Translation
- Horizontal
- Vertical

Graph

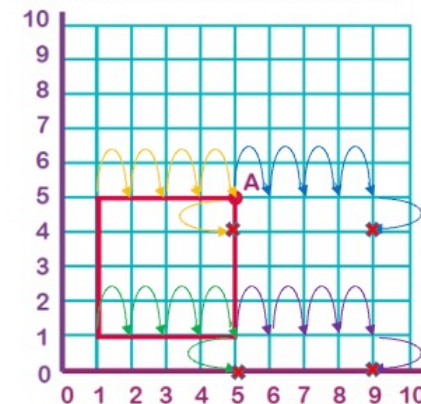


A coordinate is a point on the graph.

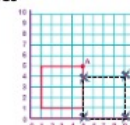
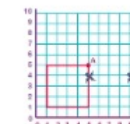
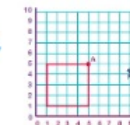
This point is (4,3).

Translation

Translate the shape 4 squares right and 1 down



1. Start with 1 corner and jump 4 squares right, and then 2 down. Draw a cross.
2. Move to the next corner and repeat the method, drawing a cross.
3. Repeat the method with the final two sides and draw your shape.

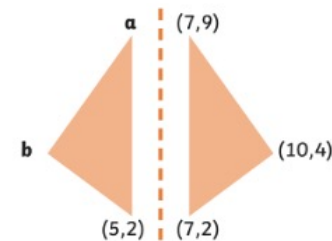


Position and direction

Y5/6



Missing coordinates

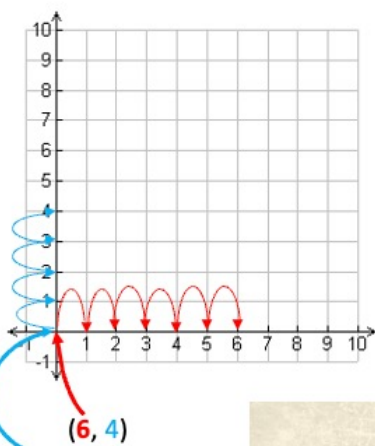


Shapes can be shown on unmarked grids.

Point a is in the same position along the x-axis as (5,2) and in the same position on the y-axis as (7,9). So, a = (5,9)

Point b is in the same position on the y-axis as (10,4). Both triangles will have the same width. The width of the right-hand triangle is 3. This means that the width of the left-hand triangle is also 3. So, b = (2,4)

Plotting a coordinate

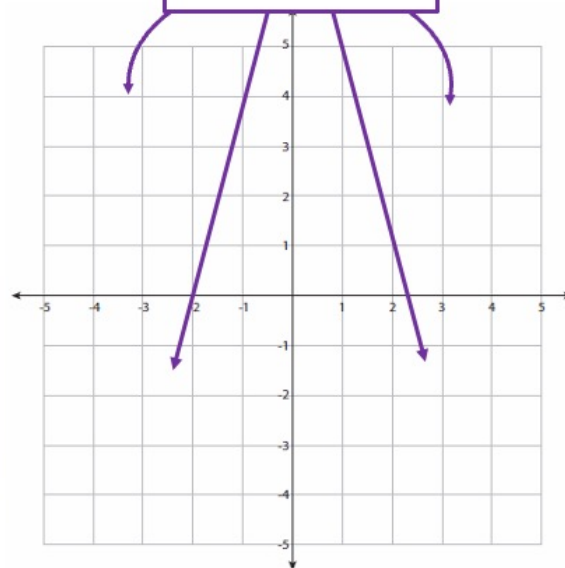


Remember!!

Along the corridor and up the stairs



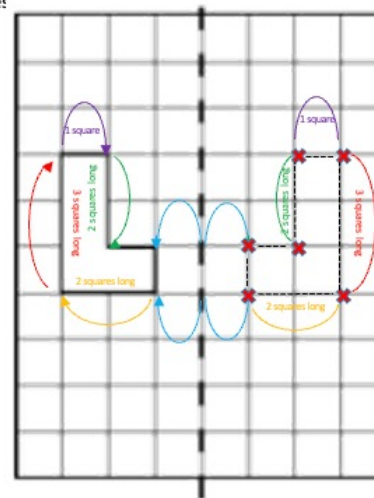
4 quadrants



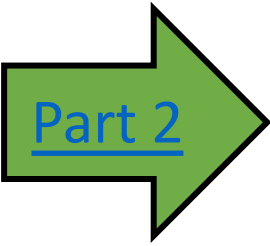
Reflection

Work in a logical order and work around the shape

1. Start closest to the mirror line. Count towards the shape and then return to the mirror line and count the same other way.
2. Move around the shape continuing to count the number of squares!



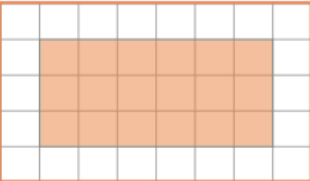

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Key Vocabulary
perimeter
area
volume
cubic units (e.g. cm ³)
cuboid
width
length
rectangle
rectilinear
parallelogram
perpendicular height

Area of Rectangles

length × width = area of a rectangle



Counting squares:
area = 18cm²

Use formula:
6cm × 3cm
area = 18cm²

8cm × 4cm area = 32cm²

Perimeter of Rectangles

perimeter = length + width + length + width or (length + width) × 2

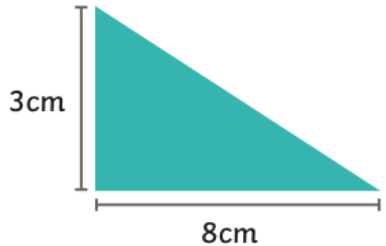



5cm + 4cm + 5cm + 4cm
perimeter = 18cm

(6 + 2) × 2
perimeter = 16cm

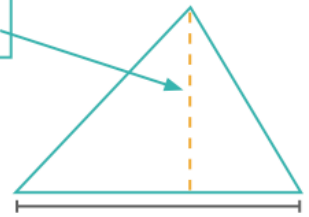
Area of Triangles

base × perpendicular height ÷ 2 = area of a triangle

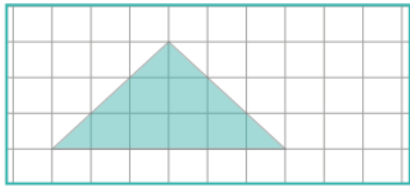


8cm × 3cm ÷ 2
area = 12cm²

perpendicular height = 5cm



6cm × 5cm ÷ 2
area = 15cm²



Counting squares:
6 whole squares = 6cm²
6 half squares = 3cm²
6cm² + 3cm² = 9cm²
area = 9cm²

Using formula:
6cm × 3cm ÷ 2 = 9cm²

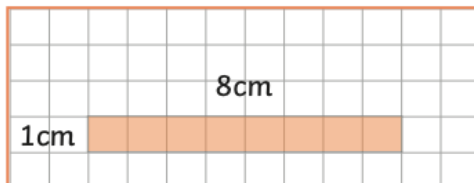


Perimeter and Area

Shapes with the same area can have different perimeters.

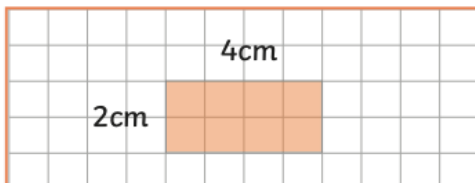


area = 8cm^2 perimeter = 12cm

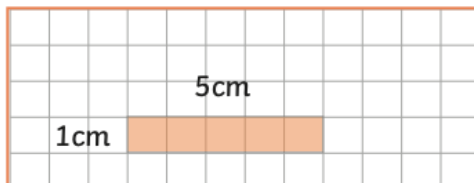


area = 8cm^2 perimeter = 18cm

Shapes with the same perimeter can have different areas.



area = 8cm^2 perimeter = 12cm

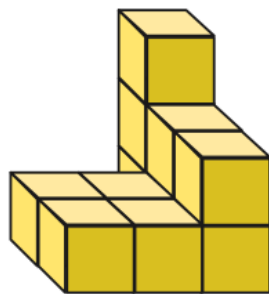


area = 5cm^2 perimeter = 12cm

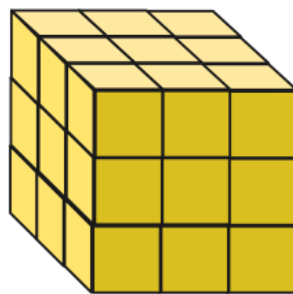
Volume - Counting Cubes



= 1cm^3



11cm^3

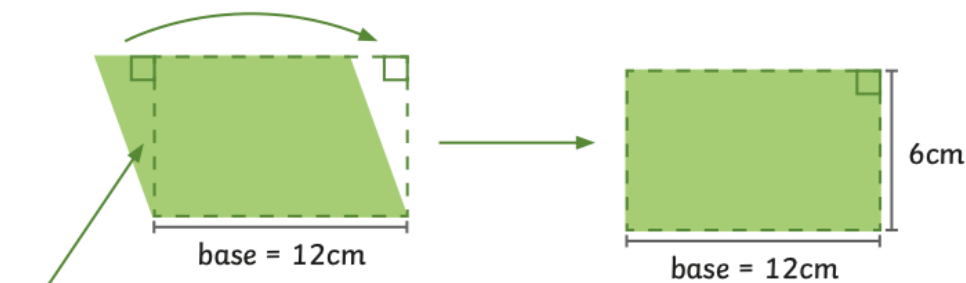


27cm^3

Area of Parallelograms

base \times perpendicular height = area of a parallelogram

A parallelogram can be transformed into a rectangle.

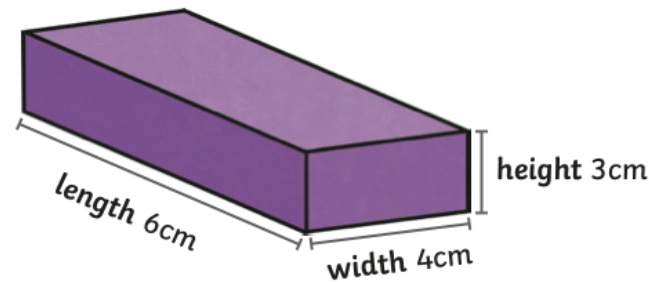


perpendicular height = 6cm

$12\text{cm} \times 6\text{cm} = 72\text{cm}^2$

Volume of Cuboids

length \times width \times height = volume of a cuboid



Multiply dimensions in **any** order:

$3\text{cm} \times 6\text{cm} \times 4\text{cm}$

volume = 72cm^3



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