

Year 6 Maths Knowledge Organisers Summer

Revision

<u>Place value</u>	<u>+ & -</u> <u>X & ÷</u>	<u>Area, perimeter and volume</u>	<u>Statistics</u>	<u>Algebra</u>	<u>Conversion/ time</u>	<u>Shape 1</u> <u>Shape 2</u>	<u>Ratio and proportion</u>	<u>Position and direction</u>	<u>Fractions, decimals and %</u>
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Click on a maths area



Vocabulary

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

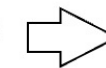
More or Less

	+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

1,009,909 → 1st
 1,023,065 → 2nd
 1,009,099 → 3rd
 1,230,650 → 4th



- 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

Larger { 1,230,650
 1,009,099

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

1.250 → 1.250

0.990 → 1.025

1.025 → Grater 0.990

0.009 → Grater number 0.009

Greater number

Grater number

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

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

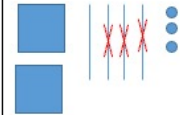
3. 3-digit and hundreds

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

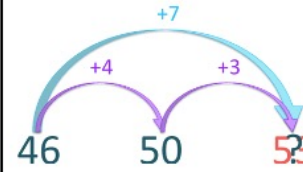
HTO
241
+52
—

- ❖ Start with the ones.
 $1+2 = 3$
- ❖ Then go to the tens.

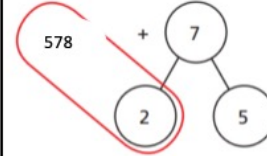
HTO
241
+ 52
—
293

Mental addition and subtraction bridging

$$46 + 7 = 53$$



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



$$580 + 5 = 585$$

- 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!
- $4 + 1 + 1 =$

Th	H	T	O
2	4	8	2
+	3	1	3
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
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

$$217 \div 7 = 31$$

- This division is quicker because you are dividing by a times table up to 12. This example is dividing by 7.

- Write in a bus stop

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

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

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

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

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

- 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

$$324 \times 13$$

- 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

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

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

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

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

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

- 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.

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

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

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

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

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

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

Multiplication and division Y5/6



Long division

$$6786 \div 29 = 234$$

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

- 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.

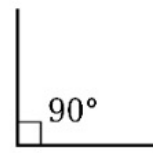
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[Click here for Shape 2](#)

Vocabulary

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

The Angles



Right Angles are 90°



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

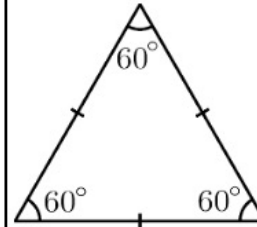


Acute angles are less than 90°



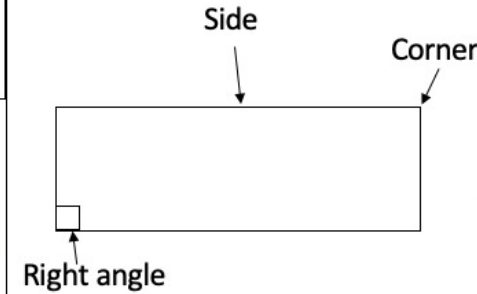
Reflex angles are greater than 180°

Angles in a triangle add up to 180°

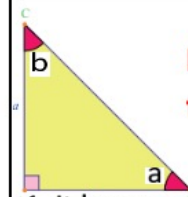


$$60^\circ \times 3 = 180^\circ$$

Labelling a 2D shape

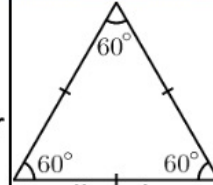


Different triangles



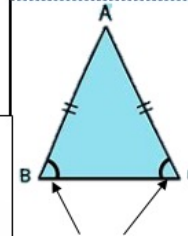
Right angled triangle

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

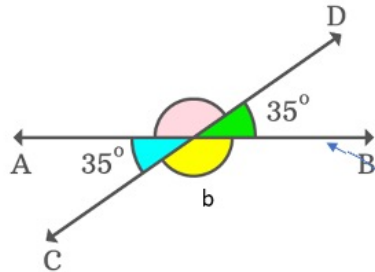


Scalene triangle

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.



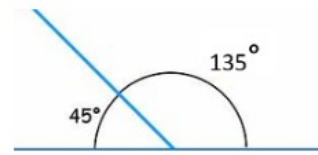
1. If one side is 35° then the other side is 35°
2. 35° and b are on a straight line so have a total of 180° altogether. Subtract 35 from 180° to find b .
 $180^\circ - 35^\circ = 145^\circ$

Shape Y5/6

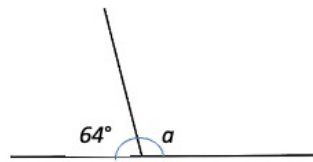
(Part 1)



Angles on a straight line add up to 180°

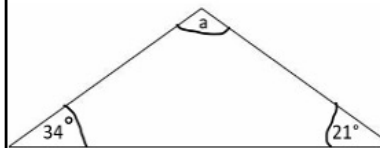


$$135^\circ + 45^\circ = 180^\circ$$



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



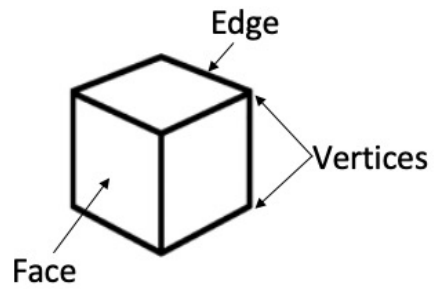
1. Add together the angles you know
 $34^\circ + 21^\circ = 55^\circ$
2. Subtract this total from 180
 $180^\circ - 55^\circ = 125^\circ$
 $a = 125^\circ$

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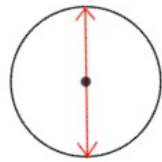
Vocabulary

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

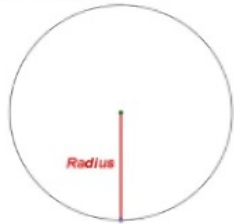
Parts of a 3D shape



Radius and diameter

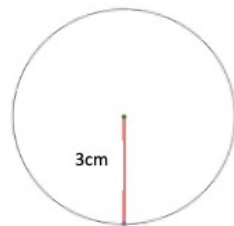


Diameter is the distance from one side of the circle to the opposite side of the circle.

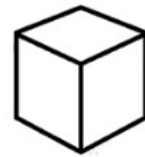


Radius is the distance from the middle of the circle to the side.

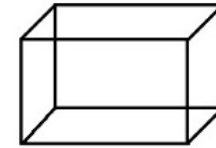
The diameter is twice as long as the radius



Radius = 3cm
Diameter = 6 cm

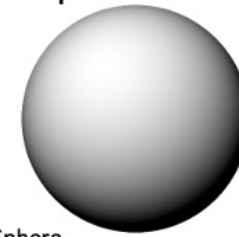


Cube
Faces = 6
Vertices = 8
Edges = 12

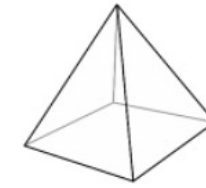


Cuboid
Faces = 6
Vertices = 8
Edges = 12

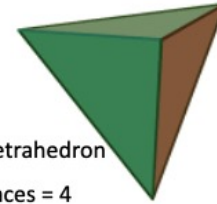
Shapes



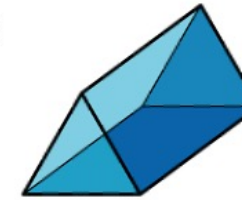
Sphere
Faces = 1
Vertices = 0
Edges = 0



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



Tetrahedron
Faces = 4
Vertices = 4
Edges = 6



Triangular prism
Faces = 5
Vertices = 6
Edges = 9

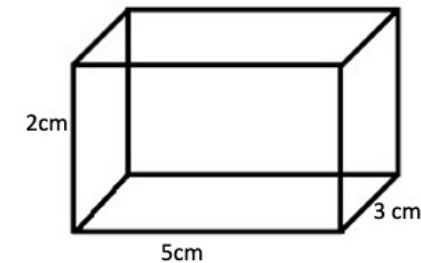
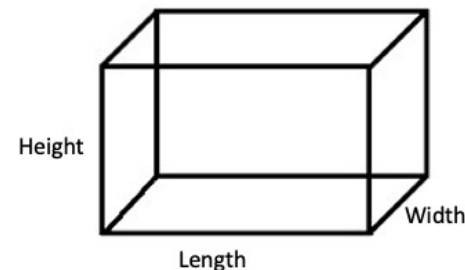
Shape Y6 (Part 2)

Volume

Volume is the 3D space something can hold

Volume = length x width x height

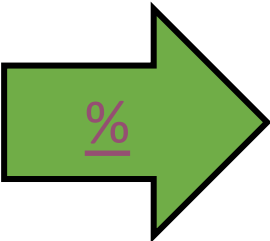
The units in volume always end in ³ for cubed (e.g. cm³)



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



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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.

$$\begin{array}{c} \text{x3} \left(\frac{4}{5} + \frac{2}{3} \right) \text{x5} \\ \frac{12}{15} + \frac{10}{15} \end{array}$$

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

3.

$$\begin{array}{c} \text{x3} \left(\frac{4}{5} + \frac{2}{3} \right) \text{x5} \\ \text{x3} \left(\frac{12}{15} + \frac{10}{15} \right) \text{x5} \\ \frac{60}{75} + \frac{60}{75} \\ \frac{120}{75} \\ = \frac{22}{15} \end{array}$$

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

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

Divide by the bottom

Times by the top

$$15 \div 5 = 3$$

$$3 \times 2 = 6$$

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

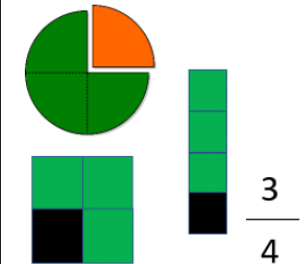


$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

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

e.g.

$$\frac{3}{6} = \frac{6}{12} \quad \frac{4}{5} = \frac{16}{20}$$



Mixed number → Improper Fractions

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

$$8 = 8, 16, 24$$

$$12 = 12, 24$$

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

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

Multiply fraction by whole number

$$\frac{2}{5} \times 3 = \frac{6}{5} = 1\frac{1}{5}$$

Improper fractions → mixed fractions

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

1. How many 3s in 17?

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

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

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

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

Subtract fractions

Lowest common multiple

$$8 = 8, 16, 24, 32, 40$$

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

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

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



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Vocabulary

- Percent (%) = out of 100
- Percentage
- Discount
- Equivalent
- Convert
- Compare
- Order
- Whole

Top tips!

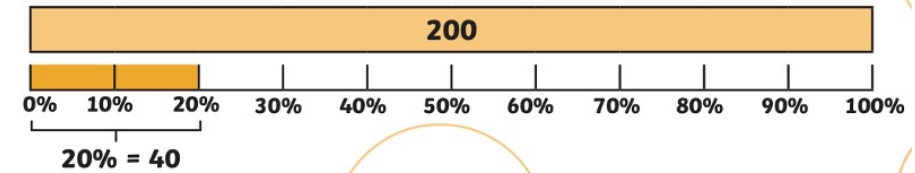
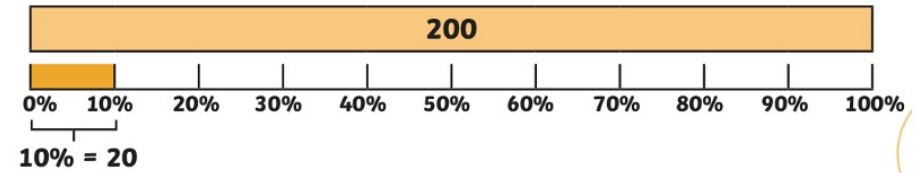
Percentages are always out of 100!

Make a fraction over 100 to make conversion easier! (see fractions to percentages)

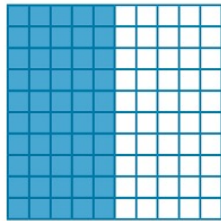
Percentages and decimals Y5/6



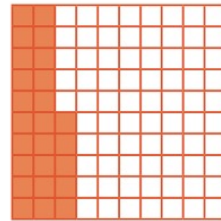
Percentage of an amount



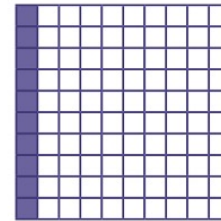
Equivalent



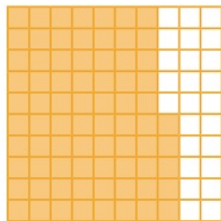
$$\frac{50}{100} = \frac{1}{2} = 0.5 = 50\%$$



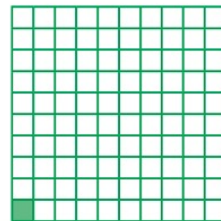
$$\frac{25}{100} = \frac{1}{4} = 0.25 = 25\%$$



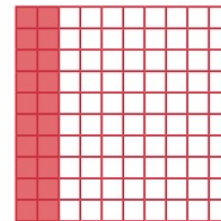
$$\frac{10}{100} = \frac{1}{10} = 0.1 = 10\%$$



$$\frac{75}{100} = \frac{3}{4} = 0.75 = 75\%$$



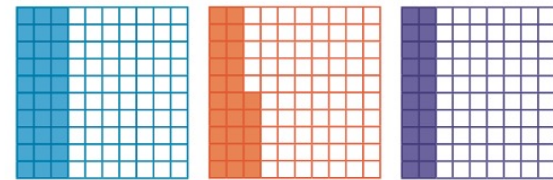
$$\frac{1}{100} = 0.01 = 1\%$$



$$\frac{20}{100} = \frac{2}{10} = 0.2 = 20\%$$

Comparing percentages, decimals and fractions

$$\frac{3}{10} > 25\% > 0.2$$

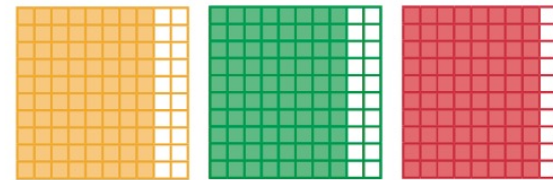


$$\frac{30}{100} = 30\%$$

$$\frac{25}{100} = 25\%$$

$$\frac{20}{100} = 20\%$$

$$80\% = 0.8 = \frac{4}{5}$$



$$\frac{80}{100} = 80\%$$

$$\frac{80}{100} = 80\%$$

$$\frac{80}{100} = 80\%$$

Fractions to percentages

$$\frac{15}{50} \xrightarrow{\times 2} \frac{30}{100} = 0.3 = 30\%$$

$$\frac{60}{200} \xrightarrow{\div 2} \frac{30}{100} = 0.3 = 30\%$$

$$50\% = \frac{1}{2} \text{ so we can divide by 2}$$

$$10\% = \frac{1}{10} \text{ so we can divide by 10}$$

$$25\% = \frac{1}{4} \text{ so we can divide by 4}$$

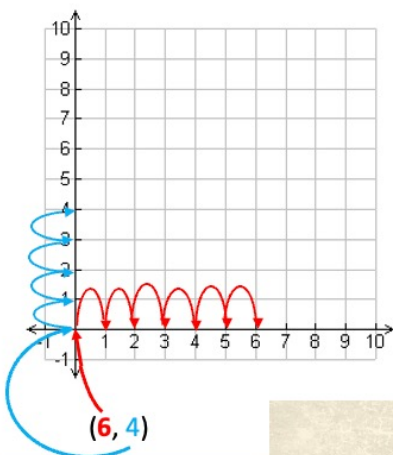
$$1\% = \frac{1}{100} \text{ so we can divide by 100}$$

Click here to return to selection page

Vocabulary

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

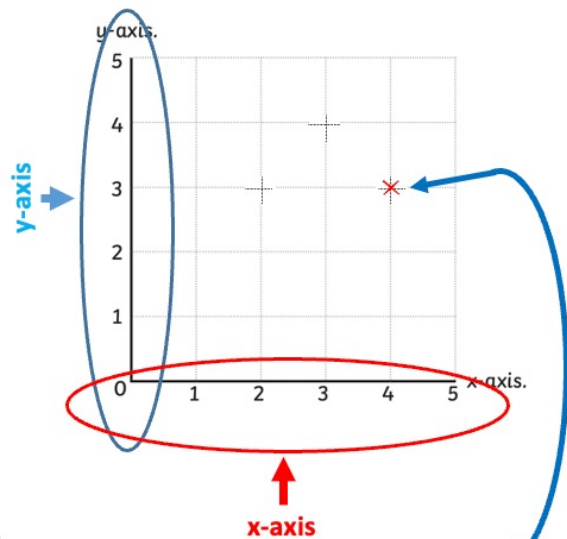
Plotting a coordinate



Remember!!
Along the corridor
and up the stairs

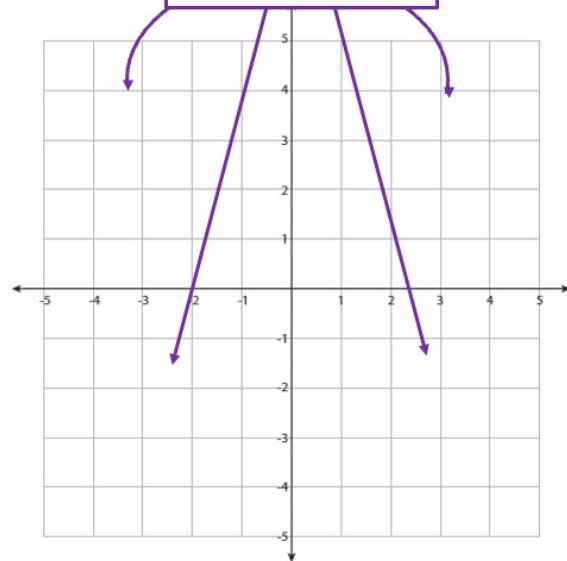


Graph



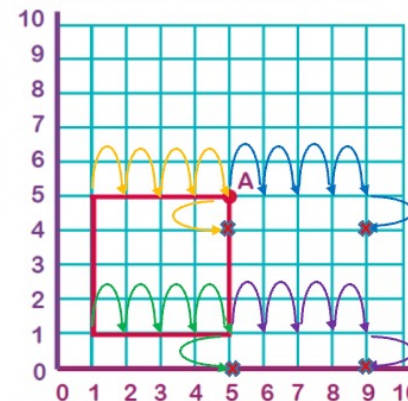
A coordinate is a point on the graph.
This point is $(4,3)$.

4 quadrants

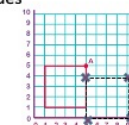
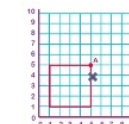
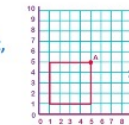


Translation

Translate the shape 4 squares right and 1 down



3. 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.
1. Repeat the method with the final two sides and draw your shape.



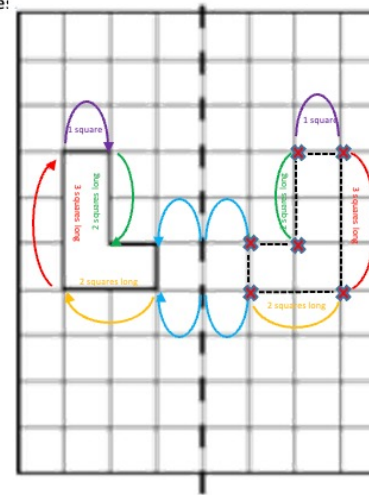
Position and direction Y5/6



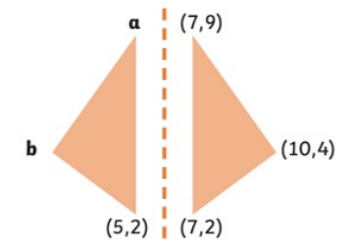
Reflection

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 the other way.
2. Move around the shape continuing to count the number of square:



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, $b = (2,4)$

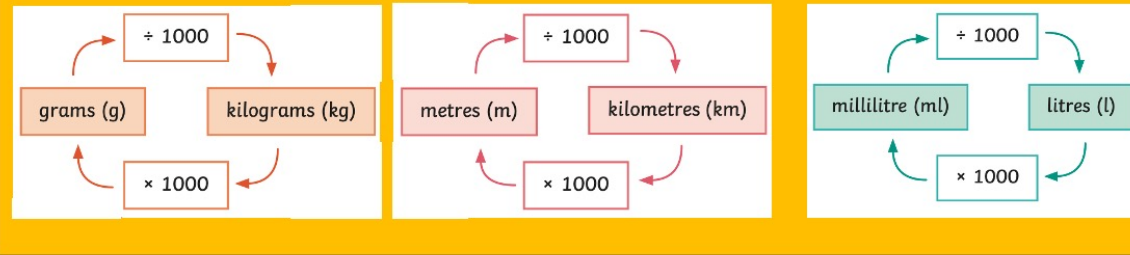
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Vocabulary

- 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

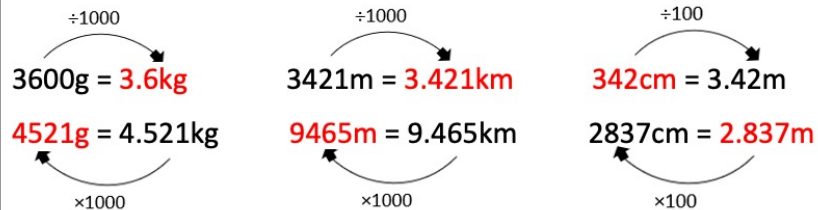
Conversion

The 1000 club!!!



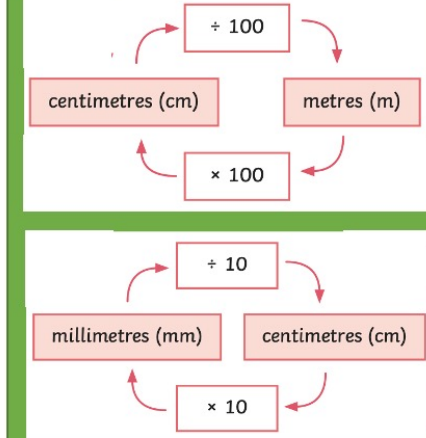
Kilo = 1000

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

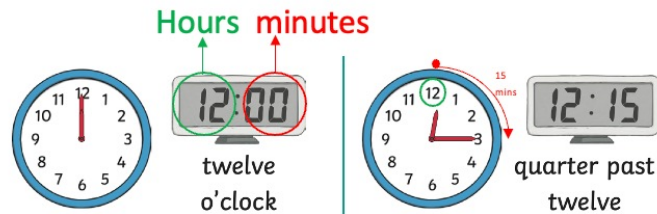


Conversion and
time
Y5/6

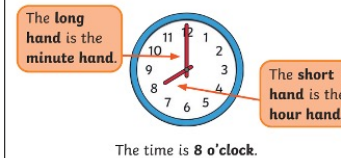
The sad club ☹️



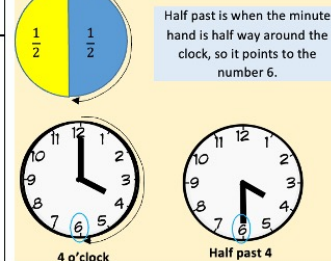
Digital and analogue



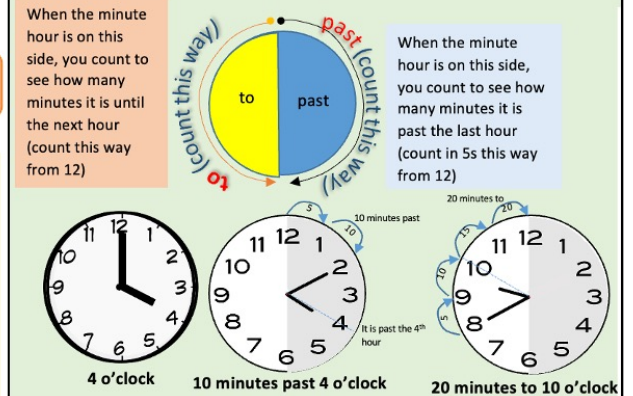
Telling the time - o'clock



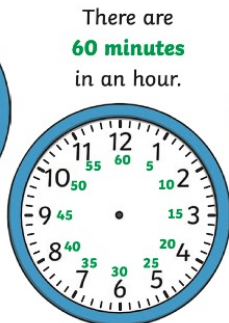
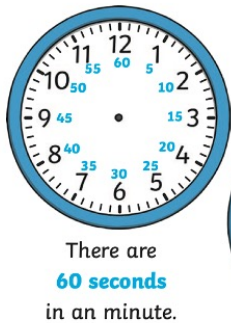
Half past



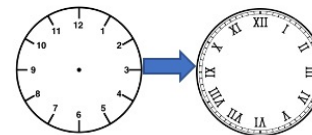
Past and to (5 minute intervals)



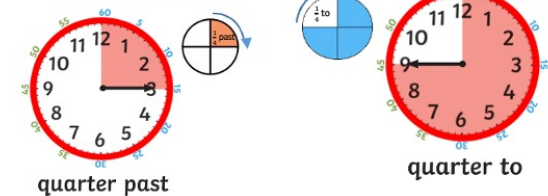
How we measure time?



Roman numerals



Quarter past and to



Click here to
return to
selection
page

Vocabulary

- Algebra
- Sequences
- Expressions
- Equations
- Formulae
- Unknowns
- Bar models

What is algebra?

Believe it or not, algebra is used as early as Reception in school. Algebra is when something other than a number is used in maths to represent a value (an unknown).

E.g. $2 + \underline{\quad} = 4$ $\bullet + \underline{\quad} = \bullet\bullet$

Missing numbers are algebra

$12 = \underline{\quad} \times 4$

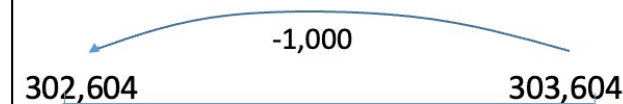
12
? ? ? ?

Question marks are also algebra as they are used instead of numbers and are unknown.

Algebra as number sequences

303,604 302,604 301,604 300,604 ...

The symbol '...' is the unknown in this question. In order to find the unknown, you need to find the difference between the numbers in the sequence. Try it with two numbers.



Therefore, $300,604 - 1,000 = \dots$

$$\begin{array}{r} 300\ 604 \\ - 1\ 000 \\ \hline 299\ 604 \end{array}$$

See addition and subtraction knowledge organiser for column subtraction

Algebra notation

Any letter or symbol can be used to represent a number.

Adding

$a + 14$ means you are adding 14 to a .
(e.g. if $a=12$, then $12+14=26$)

Subtracting

$a - 10$ means you are subtracting 10 from a .
(e.g. if $a=20$, then $20-10=10$)

Multiplying

$4a$ means 4 times the value of a (e.g. if $a=2$, then $4 \times 2=8$)

Dividing

$a \div 5$ means how many 5s are in the value of a ?

(e.g. if $a=15$, then $15 \div 5=3$)

More than one operation

You must use BODMAS (see addition and subtraction knowledge organiser).

$4a - 10$ means multiply a by 4 and then subtract 10 from this number.

(e.g. if $a=4$, then $4 \times 4=16$, then subtract $10 = 6$)

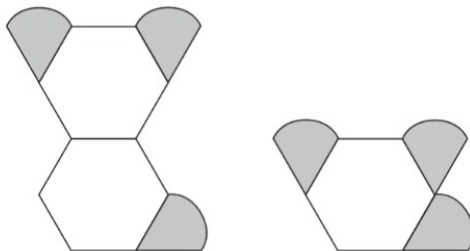
Expressions are a group of numbers and letters without the equals (=) sign. E.g. $a + 10$ or $b - c$

Equations are a group of numbers and letters with an equals (=) sign. E.g. $a + 10 = 12$ or $b - c = 1$

Formulae show how to calculate something, such as the area of a square (area = base x width)

Multi-step problem (SATs Q)

She gives each shape a value.



Total value is 147
Total value is 111
What is the value of each shape?

- Label the shapes letters $\text{Hexagon} = a$ $\text{Triangle} = b$
- So the first shape is $2a + 3b = 147$ and the second is $a + 3b = 111$

147
a a b b b

111
a b b b

Replace the letter a with 36

- The only difference between the first and second shape is the first shape has one more 'a', so $147 - 111 = a$ as subtracting finds the difference.

147
111 a

So, $a=36$

Equations with a pair of unknowns

In an equation with two unknown numbers, there may be **several** possible values for the unknowns that will balance the equation.

$ab = 18$		$2a + b = 10$	
a	b	a	b
1	18	2	6
2	9	3	4
3	6	4	2
6	3	5	0
9	2		
18	1		

Children should explore different combinations in these questions.

- If we know $a=36$, then...

111
36 b b b

$111 - 36 = 75$

- Finally, $75 \div 3 = 25$

75
b b b

$b=25$

$\text{Hexagon} = 36$ $\text{Triangle} = 25$

Algebra Y5/6



Algebra as bar models

$4c$			
c	c	c	c
$4d + 10$			
d	d	d	d
10			
$t - 15 = 85$			
t			
85			15

[Click here to return to selection page](#)

Vocabulary

- Ratio
- Proportion
- Bar model
- Multiply
- Multiplication
- Lots of
- Times
- Division
- Grouping
- Sharing
- Arrays

What is ratio?

Ratio compares the amounts of two or more things.

Example 1



The ratio of red to yellow is 2:8 as there are 2 red and 8 yellow.

Example 2



The ratio of blue to green to orange is 2:5:3.



What is proportion?

Proportion uses the ratio to find different amounts of a total and/or simplifies a ratio.

E.g.



The ratio is 1 red square to every 5 yellow squares.

The ratio is 1:4

The original ratio was 2:8 (there are 2 red squares and 8 yellow squares).

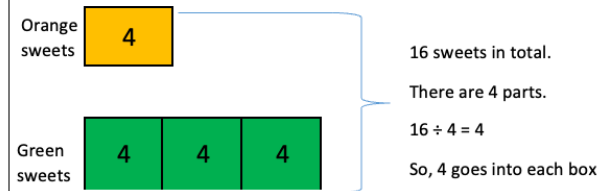
$$\begin{array}{c} 2:8 \\ \div 2 \quad \div 2 \\ \hline 1:4 \\ 2:8 = 1:4 \end{array}$$

Ratio and proportion word problems (using the bar model)

5. Jill has a bag of 16 sweets. She has 1 orange sweet for every 3 red sweets.

- a. What is the ratio of orange to red sweets? **1:3**
- b. How many orange sweets are there?

Draw a bar model for each part of the ratio.



There are 4 orange sweets and 12 green sweets ($4 \times 3 = 12$).

Ratio and proportion word problems (abstract)

➤ Jill has a bag of 16 sweets. She has 1 orange sweet for every 3 red sweets.

1. What is the ratio of orange to red sweets? **1:3**
2. How many orange sweets are there?
3. Write the ratio along with the total of the ratio (4 here)

Write the total number underneath

Orange: Red : Total

So, you must multiply all by 4

$$\begin{array}{c} 1 : 3 : 4 \\ \times 4 \text{ to get the total} \\ \hline 4 : 12 : 16 \end{array}$$

4. $1 \times 4 = 4$, so there are 4 orange sweets.
- $3 \times 4 = 12$, so there are 12 red sweets

SATs Q

You can make green paint by mixing:

- 250 ml of blue paint
- 1,150 ml of yellow paint.

Stefan wants to make some of this green paint.

He uses 750 ml of **blue** paint.

How much **green** paint does he make?

Blue	:	yellow	:	green (total)
<u>250</u>	:	1150	:	1400
<u>750</u>	:	3450	:	4200

$\times 3$ (on the left) and $\times 3$ (on the right)

Answer: He made 4200ml of green paint.

Ratio and proportion example

Purple	Red	Total
2	6	8
$\swarrow \times 6$	$\swarrow \times 6$	$\swarrow \times 6$
12	36	48

[Click here to return to selection page](#)

Mean example

12	15
10	8
15	

$$12 + 15 + 10 + 8 + 15 = 60$$

$$60 \div 5 = 12$$

The mean of this data is 12.

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

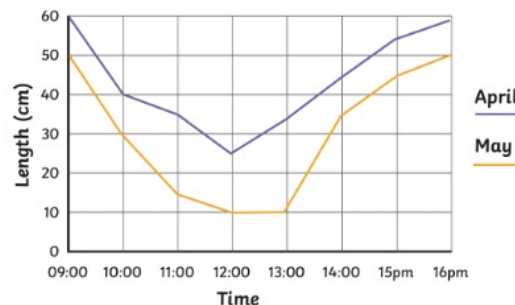
Method of Travel	Tally	Frequency
Walk		9
Bike		3
Car		6
Bus		12
TOTAL		30

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).

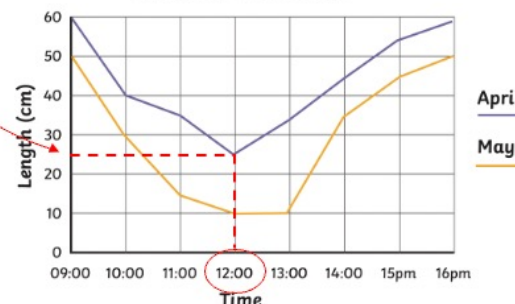
A line graph to show the length of shadows over time



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

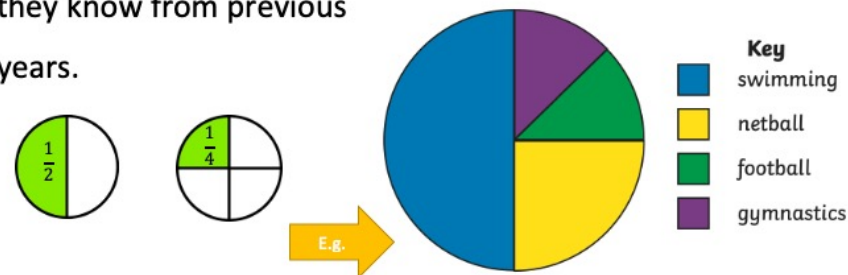


Mean is when you add up all the values and divide it by the total number of values.

Pie charts

Children should use what they know from previous years.

A pie chart to show children's favourite sports

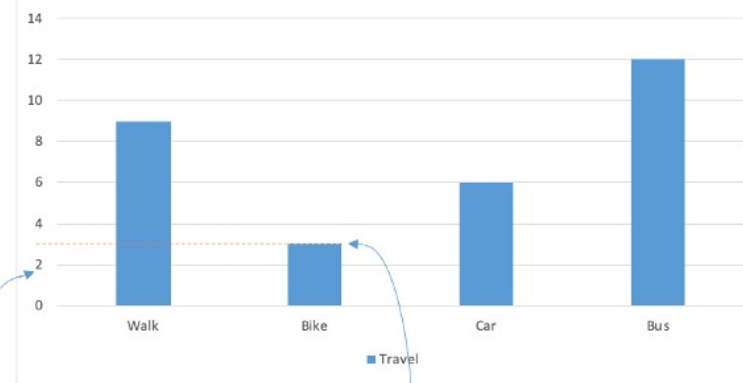


Use these fractions and the total to find out different values

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.



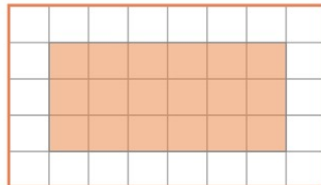
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Vocabulary

- Perimeter
- Area
- Volume
- Units
- Width
- Length
- Rectangle
- Formula
- Height
- Base
- Parallelogram

Area of rectangles

length \times width = area of a rectangle



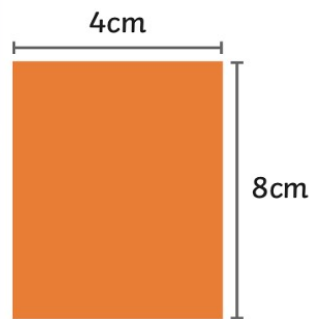
Counting squares:

$$\text{area} = 18\text{cm}^2$$

Use formula:

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

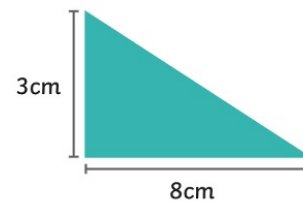
$$\text{area} = 18\text{cm}^2$$



$$8\text{cm} \times 4\text{cm} \text{ area} = 32\text{cm}^2$$

Area of triangles

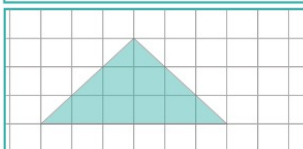
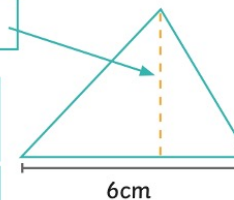
base \times perpendicular height \div 2 = area of a triangle



$$8\text{cm} \times 3\text{cm} \div 2$$
$$\text{area} = 12\text{cm}^2$$

perpendicular height = 5cm

$$6\text{cm} \times 5\text{cm} \div 2$$
$$\text{area} = 15\text{cm}^2$$



Counting squares:

$$6 \text{ whole squares} = 6\text{cm}^2$$

$$6 \text{ half squares} = 3\text{cm}^2$$

$$6\text{cm}^2 + 3\text{cm}^2 = 9\text{cm}^2$$

$$\text{area} = 9\text{cm}^2$$

Using formula:

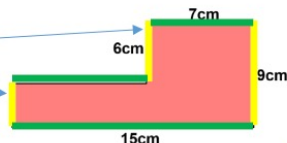
$$6\text{cm} \times 3\text{cm}$$

$$\div 2 = 9\text{cm}^2$$

Missing lengths

Use 2 colours to show vertical and horizontal lines.

$$__ + 6 = 9 \quad \text{and} \quad 7 + __ = 15$$

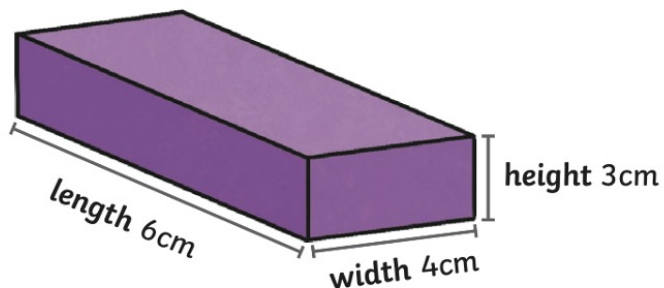


Area, perimeter and volume Y5/6



Volume of cuboids

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



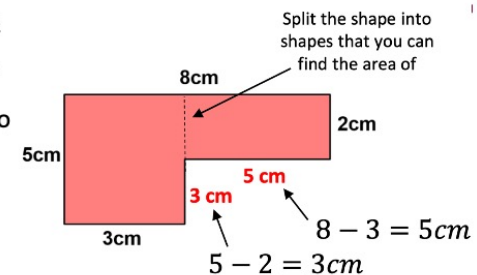
Multiply dimensions in **any** order:

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

$$\text{volume} = 72\text{cm}^3$$

Compound shapes

Compound shapes are shapes that two shapes joined together.



$$\text{Area} = (5 \times 3) + (2 \times 5)$$
$$= 25\text{cm}^2$$

$$\text{Perimeter} = 3 + 5 + 8 + 2 + 5 + 3$$
$$= 26\text{cm}$$



[Click here to return to selection page](#)