N4

Numeracy

Applications of Mathematics

Mary Russell School

Name:.....

Class:.....

Teacher:.....

Contents

Quick Recap

Times Tables

1 X	2 X	3 X	4 X	5 X
1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5
1 x 2 = 2	2 x 2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15
1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20
1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20	5 x 5 = 25
1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24	5 x 6 = 30
1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28	5 x 7 = 35
1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32	5 x 8 = 40
1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36	5 x 9 = 45
1 x 10 = 10	2 x 10 = 20	3 x 10 = 30	4 x 10 = 40	5 x 10 = 50
1 x 11 = 11	2 x 11 = 22	3 x 11 = 33	4 x 11 = 44	5 x 11 = 55
1 x 12 = 12	2 x 12 = 24	3 x 12 = 36	4 x 12 = 48	5 x 12 = 60

6 X	7 X	8 X	9 X	10 X
6 x 1 = 6	7 x 1 = 7	8 x 1 = 8	9 x 1 = 9	10 x 1 = 10
6 x 2 = 12	7 x 2 = 14	8 x 2 = 16	9 x 2 = 18	10 x 2 = 20
6 x 3 = 18	7 x 3 = 21	8 x 3 = 24	9 x 3 = 27	10 x 3 = 30
6 x 4 = 24	7 x 4 = 28	8 x 4 = 32	9 x 4 = 36	10 x 4 = 40
6 x 5 = 30	7 x 5 = 35	8 x 5 = 40	9 x 5 = 45	10 x 5 = 50
6 x 6 = 36	7 x 6 = 42	8 x 6 = 48	9 x 6 = 54	10 x 6 = 60
6 x 7 = 42	7 x 7 = 49	8 x 7 = 56	9 x 7 = 63	10 x 7 = 70
6 x 8 = 48	7 x 8 = 56	8 x 8 = 64	9 x 8 = 72	10 x 8 = 80
6 x 9 = 54	7 x 9 = 63	8 x 9 = 72	9 x 9 = 81	10 x 9 = 90
6 x 10 = 60	7 x 10 = 70	8 x 10 = 80	9 x 10 = 90	10 x 10 = 100
6 x 11 = 66	7 x 11 = 77	8 x 11 = 88	9 x 11 = 99	10 x 11 = 110
6 x 12 = 72	7 x 12 = 84	8 x 12 = 96	9 x 12 = 108	10 x 12 = 120

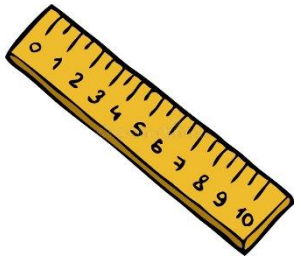
Measurement

The units we use for measuring distances are millimetres (mm), centimetres (cm), metres (m) and kilometres (km).

1cm = 10mm

1m = 100cm

1km = 1000m



To convert between units:

mm ÷10 cm ÷100 m ÷1000 km

km x1000 m x100 cm x10 mm

The units we use for measuring weight are grams (g) and kilograms (kg).

1kg = 1000g

To convert between them:

g ÷1000 kg

kg x1000 g

The units we use for measuring liquids are millilitres (ml) and litres (l)

1l = 1000ml

To convert between them:

ml ÷1000 l

l x1000 ml

Rounding Numbers

Learning Intention

To round numbers to nearest 10, 100, 100 and to 1 and 2 decimal places

Success Criteria

- ✓ Check which column you are rounding to
- ✓ Look at the column to the right
- ✓ Remember the rule – if it's 4 or below we round down, 5 or above we round up

We can round to the nearest 10, 100 and 1000.

For the nearest 10, we look at the number in the unit column and follow the rule.

For example:

45 ⇨ 50

32 ⇨ 30

The rule is: if it's 4 or below we round down, 5 or above we round up.

Now round the following to the nearest 10:

Question	Answer
74	
12	
3	
96	
554	
148	
635	
149	

For the nearest 100, we look at the number in the tens column and the same rule applies:

For example:

524 ⇨ 500

412 ⇨ 400

The rule is: if it's 4 or below we round down, 5 or above we round up.

Now round the following to the nearest 100:

Question	Answer
241	
358	
499	
754	
50	
49	
999	
25	
167	
198	
756	
254	
758	

For the nearest 1000, we look at the number in the hundreds column and as before the rule applies.

For example:

4575 ⇨ 5000

3241 ⇨ 3000

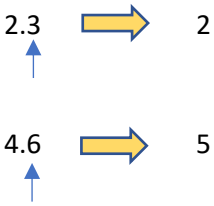
The rule is: if it's 4 or below we round down, 5 or above we round up.

Now round the following to the nearest 1000:

Question	Answer
7468	
2489	
999	
499	
1547	
2548	
7619	
1245	
3951	
8566	
1247	
1115	

We can round numbers to the nearest whole number by looking at the next number (the number after the decimal point).

For example



The rule is: if it's 4 or below we round down, 5 or above we round up.

Now round the following numbers to the nearest whole number, write your answers in the boxes below:

Question	Answer
7.6	
5.2	
4.8	
11.3	
6.5	
3.42	
6.25	
4.75	
16.24	
13.39	
6.15	
3.18	

We can also round to decimal places using the same rule.

To round to one decimal place, we need to look at the second number after the decimal point (the hundredths column).

For example:

1.24 ⇨ 1.2

4.683 ⇨ 4.7

The rule is: if it's 4 or below we round down, 5 or above we round up.

Now round the following to one decimal place:

Question	Answer
4.52	
1.26	
7.65	
4.795	
46.25	
74.19	
18.462	
45.224	
9.999	
4.875	
0.452	
40.785	

To round to two decimal places, we need to look at the third number after the decimal point (the thousandths column).

For example:

5.338 ⇨ 5.34

7.6549 ⇨ 7.65

The rule is: if it's 4 or below we round down, 5 or above we round up.

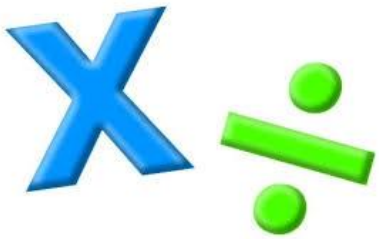
Now round the following to two decimal places:

Question	Answer
4.515	
3.154	
7.649	
1.724	
12.846	
8.134	
7.496	
3.194	
9.999	
12.5842	
41.1497	
82.6482	

Multiplying and Dividing by 10, 100 and 1000

Learning Intention

To multiply and divide numbers by 10, 100 and 1000



Success Criteria

- ✓ For multiplying, move numbers to the left
- ✓ For dividing, move numbers to the right

When we multiply a number by 10, we move all the numbers one place to the left.

For example:

56 x 10 = 560 24 x 10 = 240

We do the same for multiplying decimals by 10.

For example:

7.4 x 10 = 74 1.8 x 10 = 18

Now try the following **without** a calculator:

Question	Answer
75 x 10	
24 x 10	
715 x 10	
92 x 10	
1.4 x 10	
48.5 x 10	
7.5 x 10	
2.45 x 10	
3.94 x 10	

To multiply a number by 100, the numbers move 2 places to the left.

For example:

451 x 100 = 45100

1.245 x 100 = 124.5

Now try the questions below without a calculator:

Question	Answer
24 x 100	
78.1 x 100	
7.64 x 100	
6.153 x 100	
23.45 x 100	
100.5 x 100	
45.82 x 100	
15.546 x 100	
16.45 x 100	
87.29 x 100	
78.625 x 100	
76.457 x 100	
12.795 x 100	
58.61 x 100	

To multiply a number by 1000, the numbers move 3 places to the left.

For example:

145 x 1000 = 145000

3.49 x 1000 = 3490

Now try the questions below without a calculator:

Question	Answer
745 x 1000	
70210 x 1000	
2.156 x 1000	
5.154 x 1000	
2.14 x 1000	
8750 x 1000	
7400 x 1000	
7.16 x 1000	
3.4 x 1000	
2.504 x 1000	
1578 x 1000	
64.5 x 1000	
79.46 x 1000	
21.6 x 1000	

To divide a number by 10, the numbers move 1 place to the right.

For example:

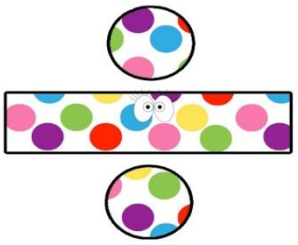
5640 ÷ 10 = 564

12.4 ÷ 10 = 1.24

Now try the questions below without a calculator:

Question	Answer
24 ÷ 10	
364 ÷ 10	
785 ÷ 10	
4051 ÷ 10	
1056 ÷ 10	
52.01 ÷ 10	
84.2 ÷ 10	
1.652 ÷ 10	
17.2 ÷ 10	
45.85 ÷ 10	
36.49 ÷ 10	
28.256 ÷ 10	
976.1 ÷ 10	
145.2 ÷ 10	

To divide a number by 100, the numbers move 2 places to the right.



For example:

4751 ÷ 100 = 47.51

10.4 ÷ 100 = 0.104

Now try the questions below without a calculator:

Question	Answer
204 ÷ 100	
452 ÷ 100	
2168 ÷ 100	
7953 ÷ 100	
455.28 ÷ 100	
32.18 ÷ 100	
64.59 ÷ 100	
13.5 ÷ 100	
1 ÷ 100	
0.245 ÷ 100	
5.48 ÷ 100	
8.67 ÷ 100	
1.2 ÷ 100	
6.78 ÷ 100	

To divide a number by 1000, the numbers move 3 places to the right.

For example:

45965 ÷ 1000 = 45.965

98 ÷ 1000 = 0.098

Now try the questions below without a calculator:

Question	Answer
84560 ÷ 1000	
45877 ÷ 1000	
6784 ÷ 1000	
756 ÷ 1000	
124.5 ÷ 1000	
876.2 ÷ 1000	
675.8 ÷ 1000	
4.85 ÷ 1000	
32.54 ÷ 1000	
1.487 ÷ 1000	
4875.6 ÷ 1000	

How did you get on:

- ✓ When multiplying, did you move numbers to the left?
- ✓ When dividing, did you move numbers to the right?

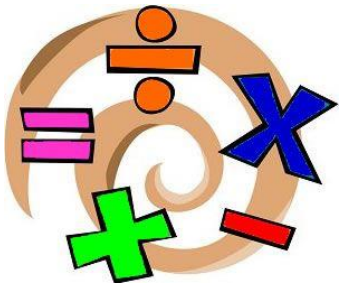
Four Operations

Learning Intention

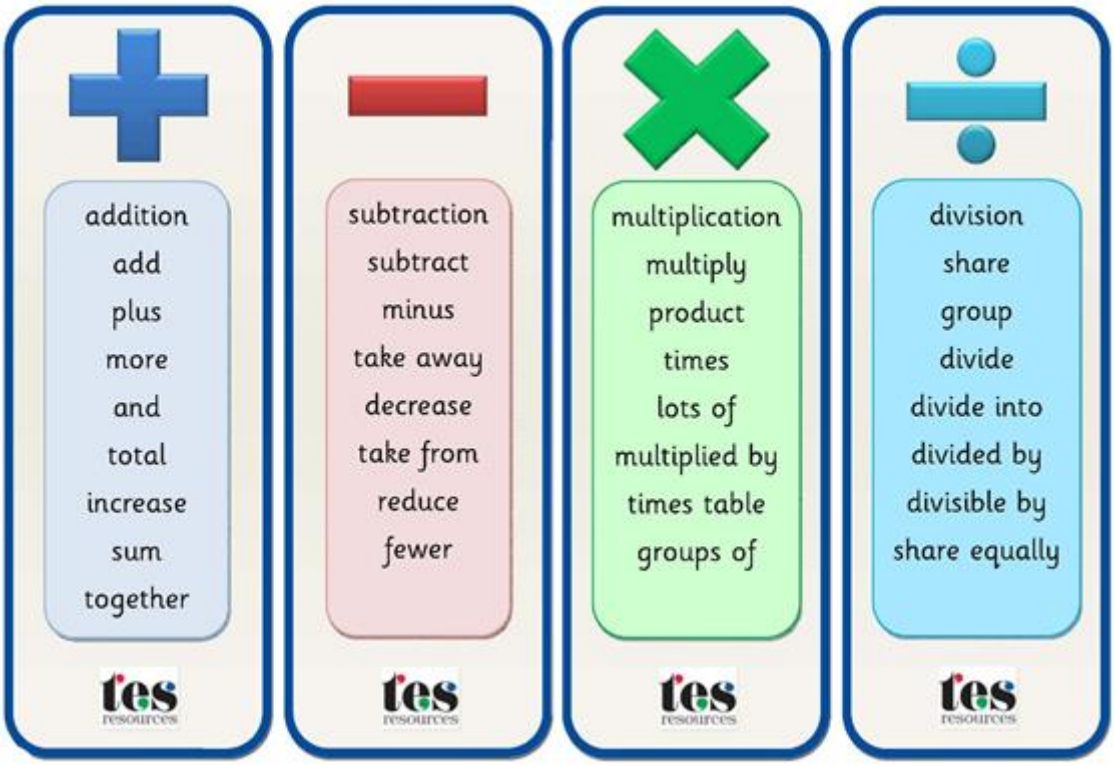
To use +, -, x and ÷ to solve problems

Success Criteria

- ✓ Select the appropriate operation to carry out calculations
- ✓ Use the selected operation appropriately
- ✓ Remember the units



The four operations are addition, subtraction, multiplication and division. Here are some other words for them:

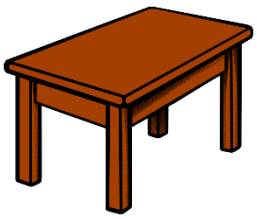


Here you may have to add, subtract, multiply or divide.

You need to decide which to operation to use and complete the calculation.

For example,

Two tables are placed together to form a larger one. If the first table is 67·4 cm long and the second table is 56·8 cm long, what is the total length?



Here we are adding so 67.4 + 56.8 = <u>124.2cm</u>

Now try the questions below, write your working and answer in the box opposite:

You can use a calculator.

Question	Working and Answer
A piece of wood is 37·4 cm long. If 12·7 cm is cut off from one end what length remains?	
A child places 5 toy bricks of length 14·6 cm in a straight line. What is the total length?	
A piece of ribbon 114·8 cm long is shared equally among 7 girls. What length should each girl receive?	
Three boxes weigh 4·6 kg, 7·9 kg and 18·2 kg. What is the total weight?	
A bottle of Coca-Cola holds 2 litres. What volume remains after a glass of 0·35 litres has been removed?	

What length of shelf is needed to hold books with thicknesses of 6·3 cm, 7·4 cm, 1·8 cm, 2·8 cm and 4·9 cm?	
Michael is preparing a sandwich buffet. He has 5 loaves of bread each containing 18 slices of bread. He needs 2 slices of bread per sandwich. How many sandwiches can he make? *Hint: there are 2 steps to solving this!*	
An empty basket weighs 120g. 12 eggs are put in and it now weighs 720g. How much does each egg weigh? *Hint: there are 2 steps to solving this!*	
A factory makes and packs candles. An empty box weighs 350g. When 30 candles are put in, the total weight is 3050g. How much does each candle weigh? *Hint: there are 2 steps to solving this!*	

How did you get on?

- ✓ Can you select the appropriate operation to carry out calculations?
- ✓ Can you use the selected operation appropriately?
- ✓ Did you remember the units?

Now you're ready to try assessment question 2

Percentages

Learning Intention

To calculate percentages of an amount and use this to solve problems

Success Criteria

- ✓ Understand how to calculate a percentage
- ✓ Calculate the percentage
- ✓ Use this to solve problems
- ✓ Remember the units

PERCENT literally means PER HUNDRED, so we're going to be dividing by 100 here. You can use a calculator.

For example,

Find 25% of £120

25 ÷ 100 x 120 = £30

Find 20% of 160kg

20 ÷ 100 x 160 = 32kg

Now try the following questions, write your working and answers in the box opposite. You **can** use a calculator.

Question	Working and Answer
30% of £60	
5% of 98kg	

16% of 54ml	
64% of £85	
50% of 166m	
16% of £250	
15% of 300miles	
7% of 400m	
31% of £720	
34% of 340litres	
16% of £240	
52% of £63	
33% of 900m	
37% of 7kg	
4% of £63	

Percentage Rise/Fall

Sometimes we need to calculate percentages to solve problems.

For example,

A mobile phone costs £150, it is on sale with a 20% discount.

(a) How much is the discount?
(b) How much does the phone cost now?

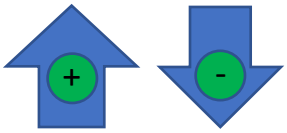
(a) 20 ÷ 100 x 150 = 30
(b) 150 – 30 = £120

So here we are calculating the percentage as normal then either adding or subtracting from the original amount.

We need to think about whether we add or subtract.

If its an increase, then we add.

If it's a decrease, then we subtract.



Try the questions below, write your working and answer in the box opposite.

Question	Working and Answer
A bat colony has 40 bats. Over the breeding season, the population increases by 30%. (a) How many new bats were born? (b) How many bats are there in the colony now?	
A petri dish contains 240 bacteria. These increase overnight by 23% (a) How many extra bacteria are there? (b) How many bacteria are there altogether the next morning?	
A company gives all its workers a 5% pay rise. Joan earns £240 per week. (a) How much extra does Joan earn? (b) What does Joan earn with her new payrise?	

A clothes shop reduces its prices by 15%. A coat originally cost £45. (a) How much has the coat been reduced by? (b) What is the new price of the coat?	
James earns £1200 per month. Martha earns 20% more. (a) How much more does Martha earn? (b) How much does Martha earn?	
Jamie bought a new laptop which cost £250 + VAT. VAT is charged at 20%. What is the total cost of the laptop? *Hint: follow the same steps as above*	
The Gravel King is selling 4kg bags of gravel at £25 + VAT. VAT is charged at 20%. What is the total price of each bag? *Hint: follow the same steps as above*	

How did you get on?

- ✓ Do you understand how to calculate a percentage?
- ✓ Can you calculate percentages?
- ✓ Can you use this to solve problems?
- ✓ Did you remember the units?

Now you're ready to try assessment question 1

Hire Purchase

Learning Intention

To calculate and compare hire purchase deals

Success Criteria

- ✓ Calculate each deal
- ✓ Decide which is better value
- ✓ Remember the units

Hire purchase is when you buy something expensive like a TV or bike and you pay a deposit then pay more money every month for 6 or so months.

For example,

Jasmine bought a TV on the following hire purchase agreement:

£100 deposit

6 payments of £45.50.

What is the total cost?

First, we can calculate the total of the monthly payments:

6 x 45.50 = £273

Then, add on the deposit:

£273 + £100 = £373

Total cost is £373.

Calculate the total cost for the following hire purchase agreements:

Question	Working and Answer
Deposit £50 6 payments of £25	
Deposit £150 12 payments of £87.50	

Deposit £100 12 payments of £62.50	
Deposit £150 6 payments of £125	
Deposit £125 12 payments of £75.50	
Deposit £75 8 payments of £75	
Deposit £250 12 payments of £225	

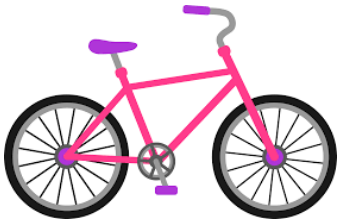
Now that we can calculate hire purchase deals, we can compare them to decide which one is better value. Remember we need to calculate the total amount and the cheapest deal is the on with the lowest total cost.

For example,

Jane wants to buy a new bike; she has found the bike she would like in 2 shops and they are offering different deals:

Shop A	Shop B
Deposit £100 6 payments of £30	Deposit £150 5 payments of £29

Which shop has the cheaper deal?



We need to calculate the total cost for both deals:

Shop A

6 x 30 = £180

180 + 100 = £280

Shop B

5 x 29 = £145

145 + 150 = £295

Shop A has the cheaper deal.

Now try the questions below:

Question	Answer
Two shops are selling the same TV but are offering different deals: Shop A: Deposit £195, 6 payments of £45 Shop B: Deposit £150, 5 payments of £70 Which is the better deal? Justify your answer by calculation.	
Two shops are selling the same fridge freezer but are offering different deals: Shop A: Deposit £175, 6 payments of £30 Shop B: Deposit £195, 5 payments of £25 Which is the better deal? Justify your answer by calculation.	

<table>
<tr>
<td>Two companies are selling the boiler but are offering different deals:
<table><tr><td>Company A
Deposit £1000
6 payments of £150</td><td>Company B
Deposit £500
12 payments of £120</td></tr></table>Which is the better deal?
Justify your answer by calculation.</td>
<td></td>
</tr>
<tr>
<td>Two companies are selling the same garage door but are offering different deals:
<table><tr><td>Shop A
Deposit £300
6 payments of £100</td><td>Shop B
Deposit £450
5 payments of £85</td></tr></table>Which is the better deal?
Justify your answer by calculation.</td>
<td></td>
</tr>
</table>

How did you get on?

- ✓ Did you calculate each deal?
- ✓ Did you decide which is better value?
- ✓ Did you remember the units?

Now you're ready to try assessment question 10

Perimeter

Learning Intention

To calculate perimeter of shapes and compound shapes

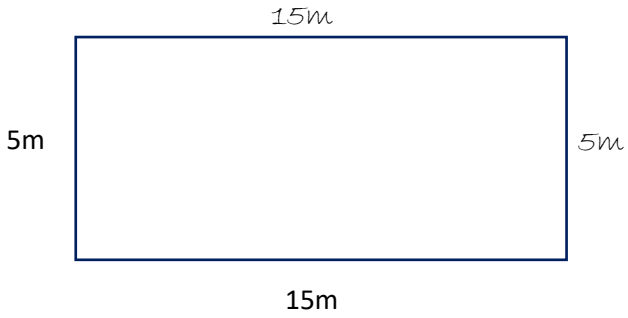
Success Criteria

- ✓ Understand how to calculate perimeter
- ✓ Ensure you include all sides of the shape
- ✓ Remember the units

Perimeter is the distance all the way around a shape.

For example,

What is the perimeter of the following shapes:



Since this is a rectangle, it has 2 pairs of equal sides so 2 long sides of 15m and 2 short sides of 5m, so we can write them on the diagram.

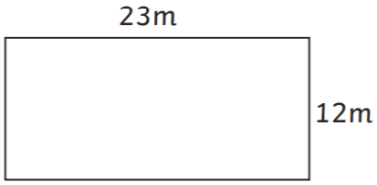
P = 15 + 15 + 5 + 5

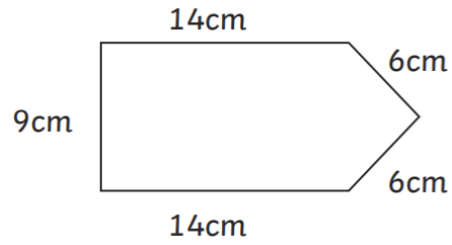
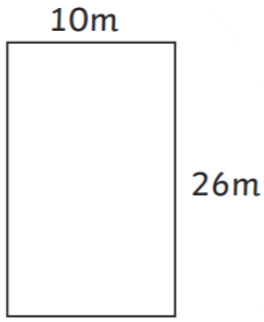
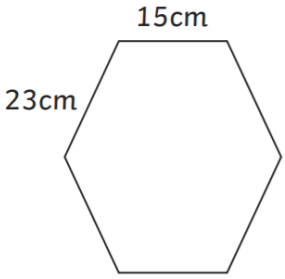
= 40m

Or P = 2 x (15 + 5)

= 40m

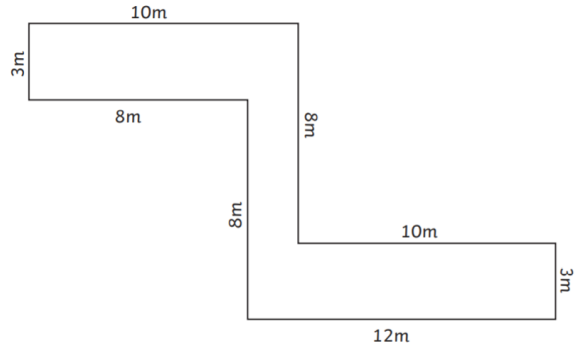
Calculate the perimeter of the following shapes:

Question	Answer
	

 14cm 6cm 9cm 6cm 14cm	
 10m 26m	
 15cm 23cm	
 18cm all sides are equal	

There are shapes called compound shapes, these are essentially simple shapes ‘stuck together’. When asked to calculate the perimeter of these shapes we do it in exactly the same way as before. Make sure you all up all the sides of the shape!

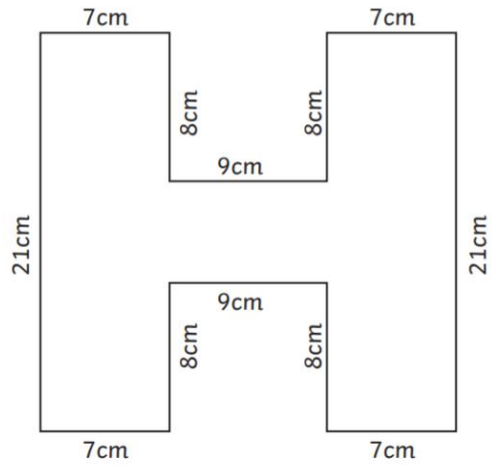
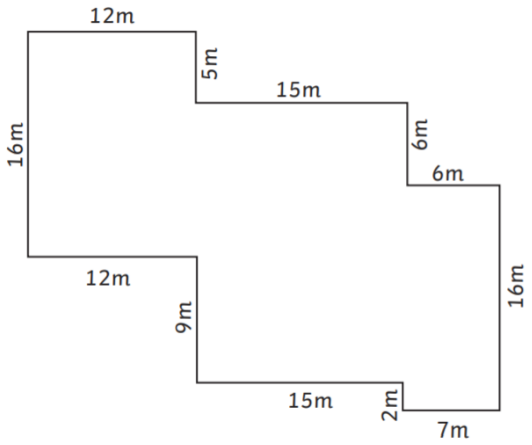
For example:

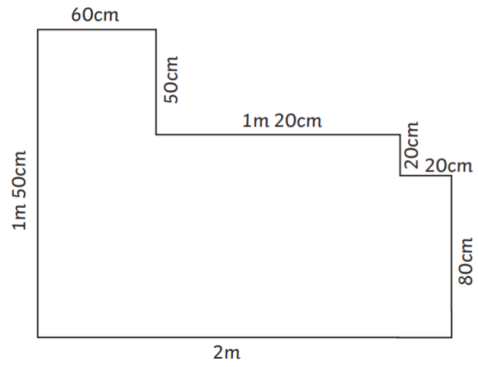


P = 10 + 8 + 10 + 3 + 12 + 8 + 8 + 3

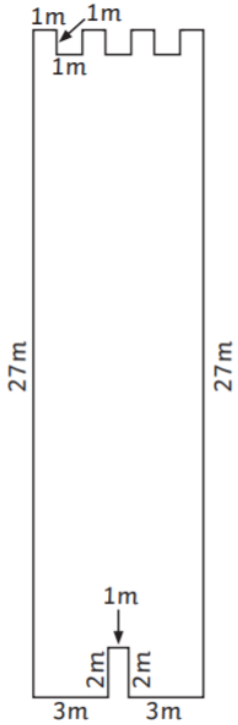
= <u>62m</u>

Now try the following questions:

Question	Answer
	
	



Hint: watch out for m and cm!



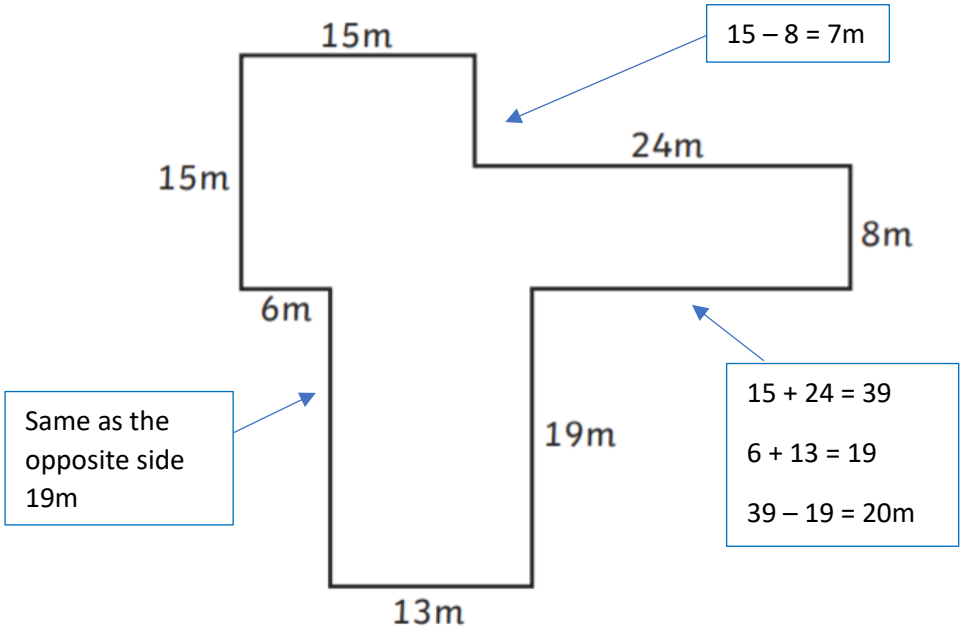
Hint: make sure you add up all the sides of this shape!

Sometimes, we're not given as much information and have to use our knowledge of shapes to help.

For example:

The school needs new guttering to go all around the building. Calculate how many metres of guttering are required.

Here some sides are missing and we need to figure out what they are before we can calculate the perimeter.

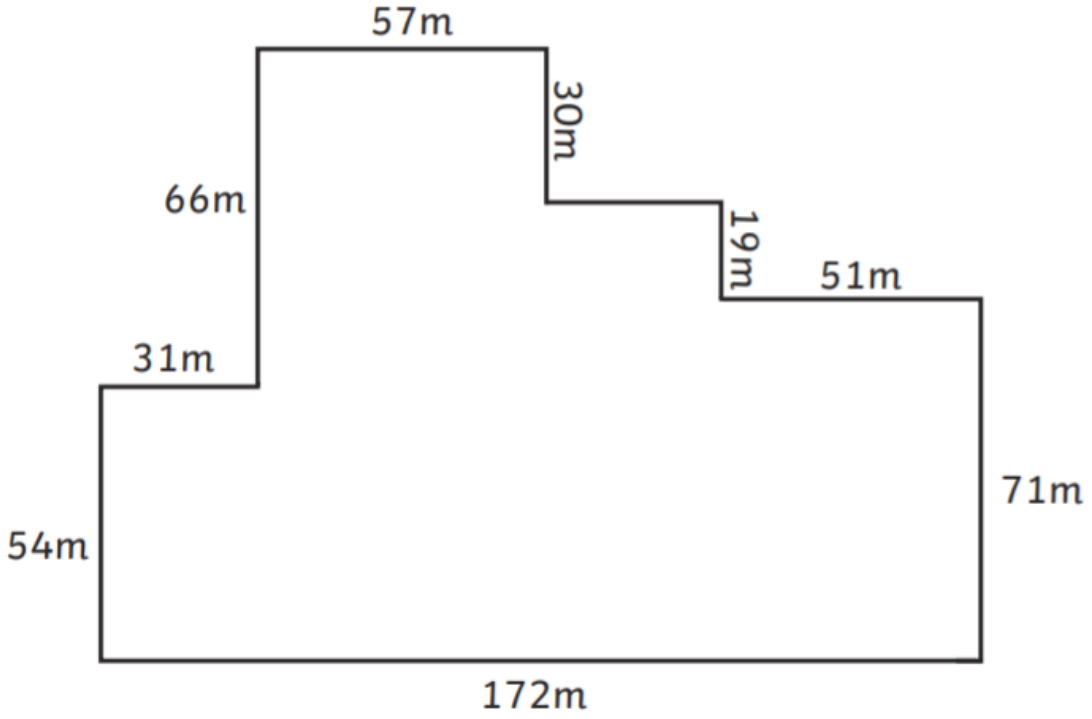


P = 15 + 7 + 24 + 8 + 20 + 19 + 13 + 19 + 6 + 15

= <u>146m</u>

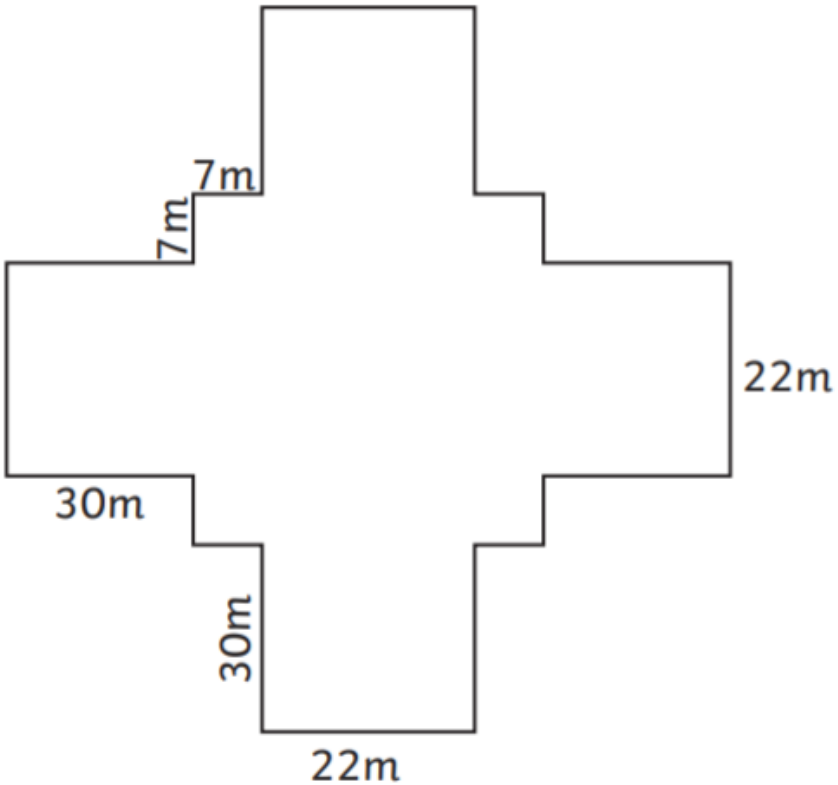
Now try the following, you can write your working and answer inside the shape.

1) Graeme is planning a campsite for a music festival. He needs to put fencing around the perimeter of the whole site. Work out how many metres of fencing he will need.



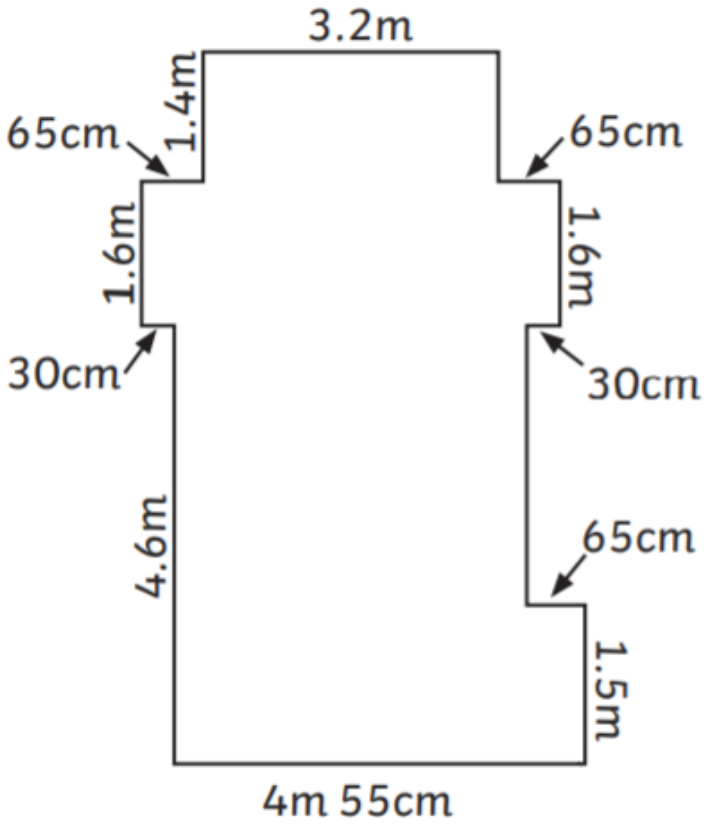
2) Emma wants to run around this circuit in her local park. How far is it all the way around?

Hint: the park has a vertical and horizontal line of symmetry.



3) Mrs Jones wants to decorate her classroom with fairy lights all the way around the room.
    a. How long do her fairy lights need to be?
    b. She has 6m of fairy lights, is this enough?

    Hint: Watch out for m and cm



How did you get on?

- ✓ Do you understand how to calculate perimeter?
- ✓ Did you ensure you included all sides of the shape?
- ✓ Did you remember the units?

Now you're ready to try assessment question 5

Time

Learning Intention

To convert between 12- and 24-hour times and solve problems involving time

Success Criteria

- ✓ Understand how to convert between 12- and 24-hour time
- ✓ Remember am/pm for morning and afternoon times
- ✓ Remember 4 digits for 24-hour time
- ✓ Use your knowledge of time to calculate time intervals and add on time

12- and 24-hour time

There are two ways of writing time, 12-hour time and 24-hour time, for example,

8.30pm is the same as 2030 hours – both of these mean half past 8 in the evening.

12-hour time

24-hour time

Converting between 12-hour time and 24-hour time:

AM

For am times (in the morning), 12- and 24-hour times look very similar:

9.15am = 0915 hours

10.40am = 1040 hours

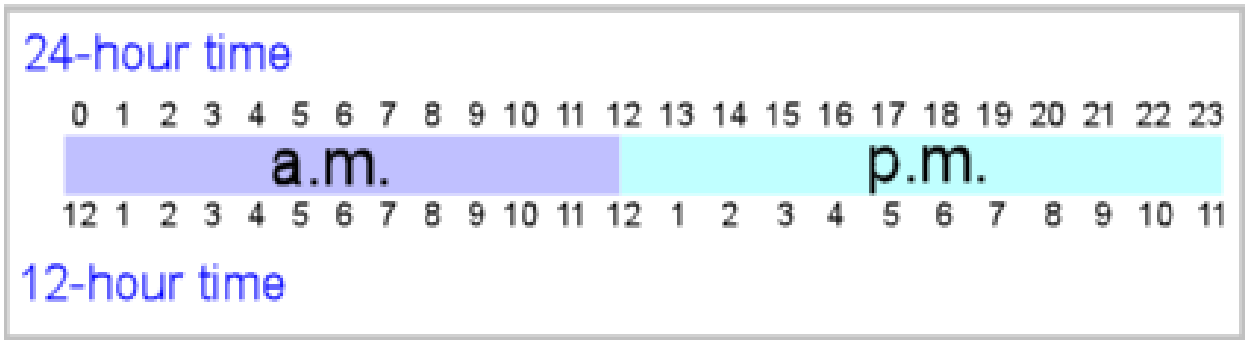
We just need to remember that 24-hour time ALWAYS has 4 digits.

PM

For pm times (in the afternoon), we need to add on 12 to the hours:

So, for example

1.30pm	7.15pm
1 + 12 = 13	7 + 12 = 19
so it becomes 1330 hours	so it becomes 1915 hours



Now convert the following 12-hour times to 24-hour time:

12-hour time	24-hour time
10.30am	
7.15pm	
9.20am	
12am (midnight)	
1.50am	
11.45am	
6.20pm	
4.45am	
7.30pm	
9.35pm	
7.10am	

3.30pm	
7.30pm	
9.20am	
3.50am	
6.45pm	
8.55pm	
10.45am	
11.25pm	
12pm (midday)	
12.45am	

Now let's convert 24-hour time to 12-hour time:

Remember to write am or pm!

12-hour time	24-hour time
	1240 hours
	0000 hours
	2145 hours
	0755 hours

	1235 hours
	1440 hours
	0645 hours
	2230 hours
	0530 hours
	1715 hours
	0925 hours
	1130 hours
	1950 hours
	0430 hours
	1845 hours
	0030 hours
	1200 hours
	1355 hours
	2020 hours
	2350 hours
	1010 hours

Time Intervals

It's also very useful to be able to work out how much time has passed, or to 'add' on time.

For example,

Sally went for a walk at 2.10pm and got home at 4.25pm.

How long was she walking for?

You may already be able to do this mentally but if not, the method below will always work.

	Hours	Minutes
2.10pm – 3.00pm	0	50
3.00pm – 4.00pm	1	0
4.00pm – 4.25pm	0	25
TOTAL	1 hour	75 minutes
	2 hours 15 minutes	

We know that there are 60 minutes in 1 hour so 75 minutes is 1 hour and 15 minutes.

Try the questions below and write your working and answer in the box opposite:

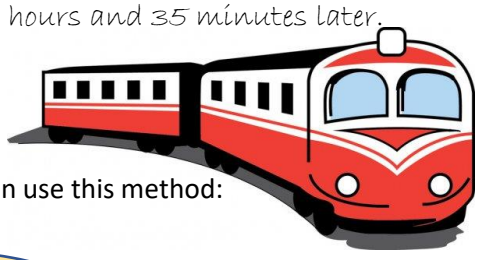
Question	Answer
Jenny started watching TV at 7.30pm and stopped at 9.15pm. How long was she watching TV for?	
Mike was playing his game from 11.30am to 1.10pm, how long was he playing his game?	
Ken played football with his friends from 10.20am to 12.00pm. How long was he playing football?	

Lauren took part in a sponsored cycle which started at 1120 hours. She finished at 1450 hours. How long was she cycling for?	
Rhonda read her book from 5.40pm until 7.20pm. How long was she reading her book?	
Rosie likes to work in her garden. She started at 9.50am and finished at 5.40pm. How long was she gardening for?	
Toby plays music from 7.10pm until 11.30pm. How long is he playing music for?	

We can also be asked to 'add' on time.

For example,

A train left Aberdeen at 9.50am and arrived in Edinburgh 2 hours and 35 minutes later. What time did it arrive?



As above, you may be able to do this mentally but if not then you can use this method:

9.50am + 2 hours 35 mins

2 hours after 9.50am is 11.50am

11.50am + 35 mins

12.25pm

<u>The train arrived in Edinburgh at 12.25pm.</u>

First, add the hours then the minutes

Try the following questions and write your working and answer in the box opposite:

Question	Answer
Chloe got on the bus at 10.45am, her journey took 55 minutes. When did she arrive?	
Chris met his friends at 1435 hours. He stayed for 2 hours 15minutes. When did he leave?	
Pippa walked her dog for 35 minutes. She left at 5.45pm, when did she get home?	
James was baking a cake; it needs to go in the oven for 45 minutes. He puts it in at 3.20pm, when will it be ready to come out?	
Jack worked for 2 hours and 55 minutes. He started at 12.35pm, when did he finish?	

How did you get on?

- ✓ Do you understand how to convert between 12- and 24-hour time?
- ✓ Did you remember am/pm for morning and afternoon times?
- ✓ Did you remember 4 digits for 24-hour time?
- ✓ Did you use your knowledge of time to calculate time intervals and add on time?

Now try assessment question 4

Distance, Speed, Time

Learning Intention

To calculate distance, speed and time using a formula

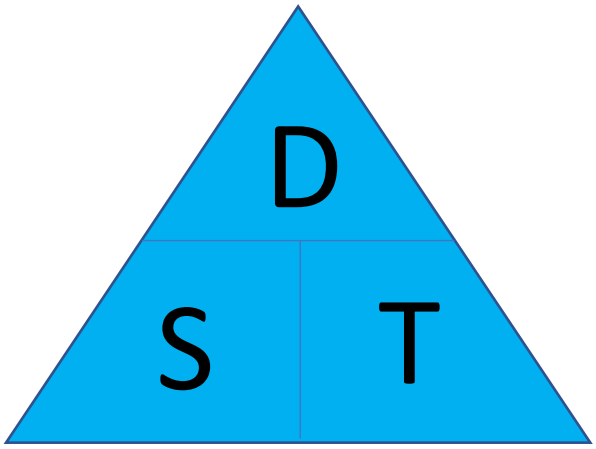
Success Criteria

- ✓ Understand how to work with time
- ✓ Use the formula correctly to calculate distance, speed and time
- ✓ Remember the units

Calculating Distance

The formula we need is Distance = Speed x Time.

We can write this as a triangle, which will then help later to calculate speed and time:



When calculating Distance D, cover up the D, which gives S x T.

D = S x T

For example,

How far can you travel walking at 5 km/h for 2 hours?

First, write down the information that the question gives… then substitute into the formula: D = S x T

S = 5km/h

T = 2 hours

D = ?

D = S x T

= 5 x 2

= 10km

It's important that the units are consistent. This means that when the speed is kilometres per hour, the distance will be kilometres and the time is in hours. Here, we are not dealing with metres, miles or minutes.

Try the following questions, write your working and answers in the box opposite. You can use a calculator.

Question	Answer
How far does a car travel at 46mph for 2 hours?	
How far does a train travel at 90mph for 6 hours?	
How far does a plane travel at 320mph for 4 hours?	
How far does a ferry travel at 13mph for 3 hours?	
How far does a lorry travel at 40mph for 2 hours?	

We can also work with times that aren't in whole hours.

For example,

How far does an athlete run at 8km/h for 30 minutes?

S = 8km/h

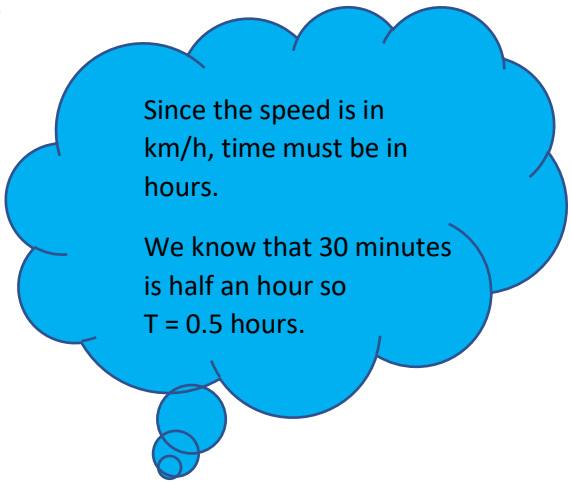
T = 30 mins = 0.5 hours

D = ?

D = S x T

= 8 x 0.5

= 4km



Similarly,

Minutes	Hours
15	0.25
30	0.5
45	0.75

Try the following questions:

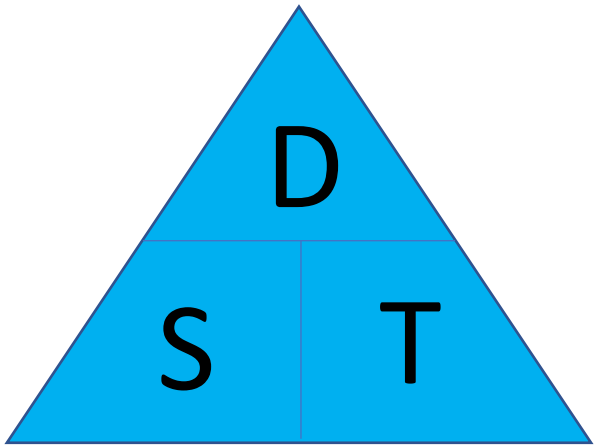
Question	Answer
How far does a car travel at 40mph for 30 minutes?	
How far does a train travel at 80mph for 45 minutes?	
How far does a canoe travel at 4mph for 15 minutes?	

How far does a ferry travel at 13mph for 3 hours?	
How far does a lorry travel at 60mph for 1 hour and 30 minutes? *Hint: This is an hour and a half so T = 1.5 hours*	
How far does a cheetah run at 30mph for 15 minutes?	

Calculating Speed

We can calculate speed by rearranging our formula: Speed = Distance ÷ Time.

Using the triangle, cover up S and its D/T. S = D ÷ T



For example,

Calculate the average speed of a runner running 12 miles in 3 hours.

D = 12 miles

T = 3 hours

S = ?

S = D ÷ T

= 12 ÷ 3

= 4 mph

As before the units must be consistent. So here we have distance in miles, time in hours so speed is a combination of these: miles per hour.

Now try the following questions writing your working and answers in the boxes opposite. You can use a calculator.

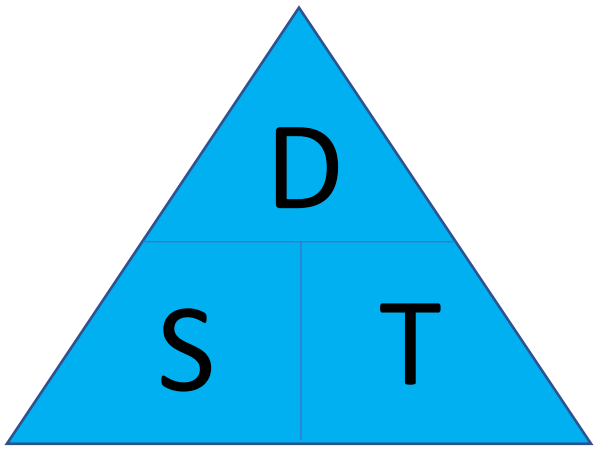
Question	Answer
A train travels 280 miles in 4 hours. What is it's average speed?	

A submarine sails 640 miles in 8 hours. Calculate it's average speed.	
A plane flies 1550 miles in 5 hours. What is it's average speed?	
A marathon runner covers 22 miles in 2 hours, calculate their average speed.	
A coach travels 483 miles in 7 hours, what is it's average speed?	
A lorry travels 8 miles in 15 minutes, what is it's average speed? *Hint: Remember 15 minutes is 0.25 hours*	
A car travels 17 miles in 30 minutes, what is it's average speed? *Hint: Remember 30 minutes is 0.5 hours*	

Calculating Time

We can calculate speed by rearranging our formula: Time = Distance ÷ Speed.

Using the triangle, cover up T and its D/S. T = D ÷ S



For example,

How long will it take a plane to travel 1200km when it flies at an average speed of 300km/h?

D = 1200km

S = 300km/h

T = ?

T = D ÷ S

= 1200 ÷ 300

= 4 hours

How long will it take for a walker to walk 10 miles at a speed of 4 miles per hour?

D = 10 miles

S = 4 mph

T = ?

T = D ÷ S

= 10 ÷ 4

= 2.5 hours

= 2 hours 30 minutes

Remember 0.5 hours is 30 minutes

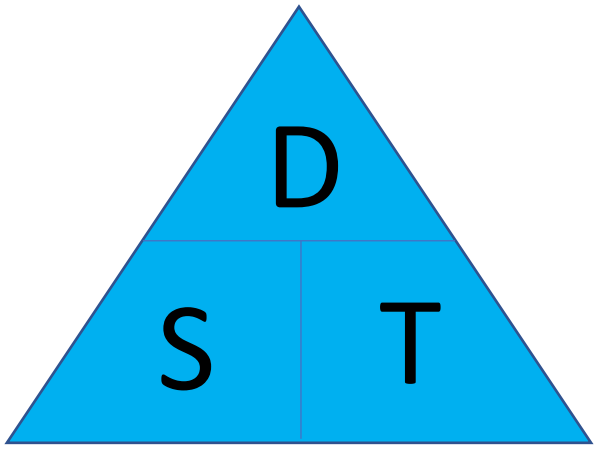
Now try the following questions and write your working and answer in the box. You can use a calculator.

Question	Answer
How long does it take to walk 15km at a speed of 5km/h?	

How long does it take to travel 60 miles at a speed of 40mph?	
How long does it take to drive 195km at 30km/h?	
Calculate the time taken to walk 15 miles at a speed of 3mph?	
Calculate the time taken to drive 90 miles at a speed of 60mph?	
How long does it take a snail to travel 8cm at 2cm/h?	
How long does it take for a steam engine to travel 140 miles at 70mph?	

Mixture – Distance/Speed/Time

Now let's try a mixture of questions. You need to decide whether you are working out distance, sped or time and use the correct formula.



For example,

A bulldozer, going at a steady speed of 16km/h, took 2.5 hours to travel from it's depot to the construction site. What was the length of it's journey?

S = 16km/h

T = 2.5h

D = ?

D = S x T

= 16 x 2.5

= 40km

As before, write down the information that we have - here we have the speed and time and need to calculate the distance.

From the triangle D = S x T

Now try the following questions, write your working and answer in the box opposite.

Question	Answer
A hot air balloon travelled 50km at an average speed of 20km/h. How long did it take to complete it's journey?	
A tractor is travelling at 6 km/h, how long will it take to cover a field distance of 9km?	

Henry can walk the 2 miles to work in 30 minutes. Calculate in mph, his walking speed.	
A bird takes 12.5 days to migrate from the UK to the USA. If it maintains an average speed of 200 miles per day, what distance will it fly to reach America?	
At full speed, a tortoise can travel at 0.5m per minute. How long would it take to cross a garden path measuring 1.5m?	
A bus travels at a speed of 24mph for 15 minutes. How far does it travel in this time? *Hint: 15 minutes = 0.25 hours*	

How did you get on?

- ✓ Do you understand how to work with time?
- ✓ Did you use the formula correctly to calculate distance, speed and time?
- ✓ Did you remember the units?

Now you're ready to try assessment question 6

Negative Numbers

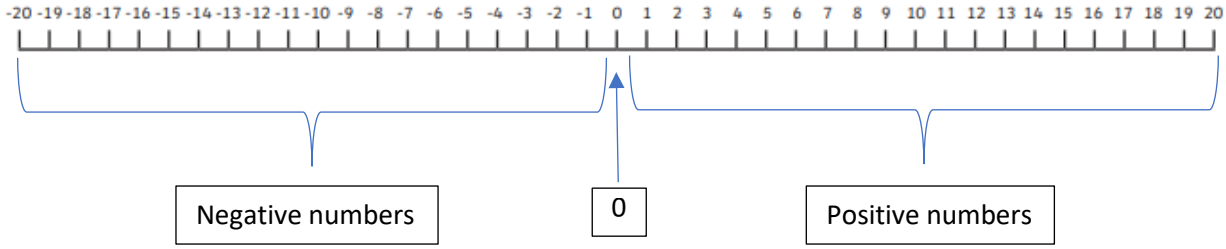
Learning Intention

To do calculations involving negative numbers

Success Criteria

- ✓ Understand how the number line extends to negative numbers
- ✓ Mark the numbers on the scale and count the jumps
- ✓ Remember the units

Negative numbers aren't sad! They're numbers less than zero. For example, -2, -42, -679.



This shows a number line with 0 in the middle, positive numbers which are bigger than zero and negative numbers which are less than zero. Positive numbers go on for every (they are infinite), negative numbers are the same.

Use the number lines below to help to count backwards beyond 0. Start on the number given and draw the correct number of jumps backwards until you get to the answer.

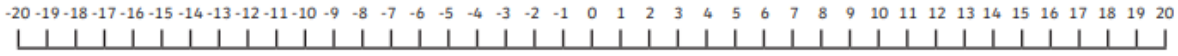
For example,

From 5, count back 7

So we start at 5 and do 7 jumps back to get to our answer of -2.

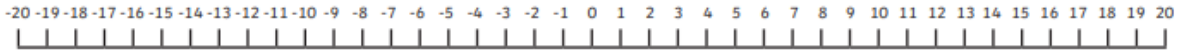
Try the following:

From 8, count back 12



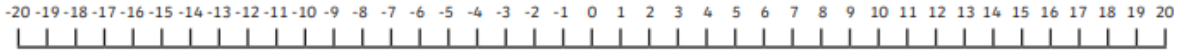
Answer:……

From 7, count back 15



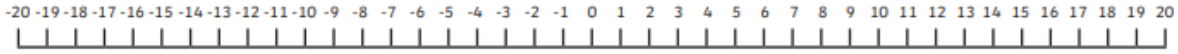
Answer:……

From 2, count back 9



Answer:……

From 12, count back 22

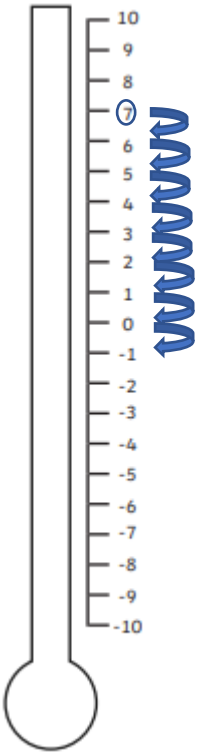


Answer:……

We hear of negative numbers in real life in relation to temperature.

For example, in winter the temperature outside could be -2^{o}C.

Have a look at the thermometer below:



The temperature is 7^{o}C and drops by 8^{o}C.

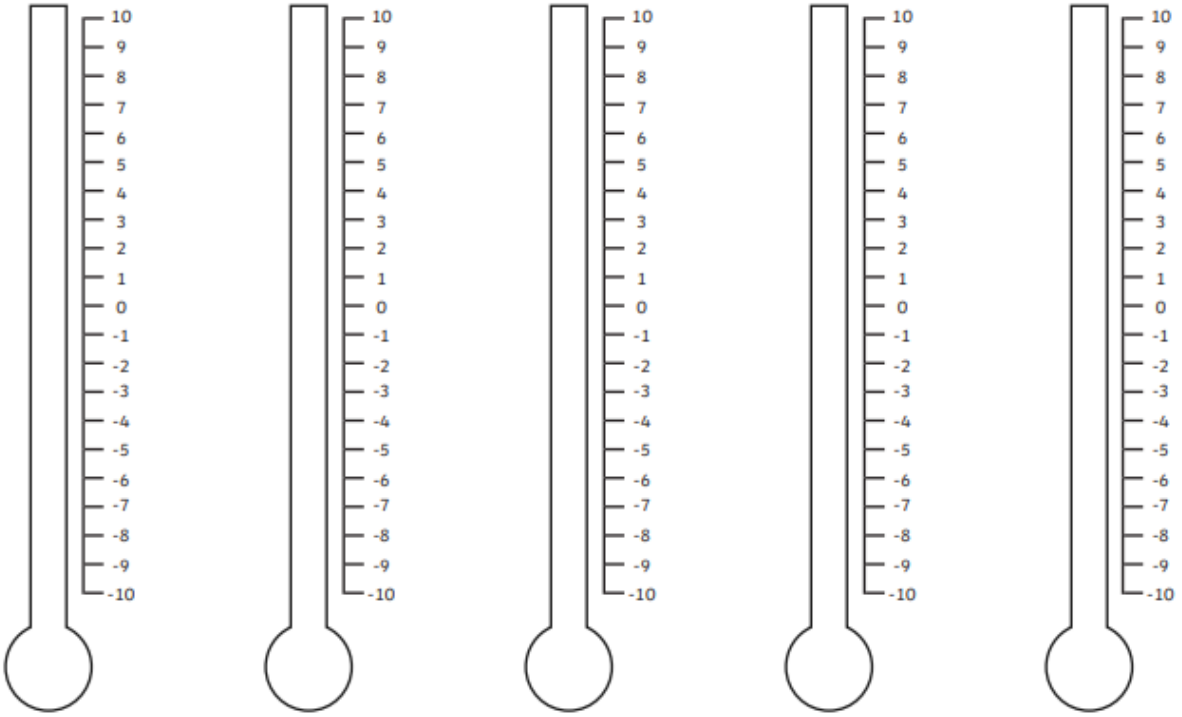
What is the new temperature?

We do this in the same way, start at 7 and count 8 jumps backwards.

We get to the answer of -1^{o}C.

Now calculate the new temperature for each question. Use the thermometers to count down.

(a) The temperature has cooled from 3°C by 5°C
(b) The temperature has cooled from 6°C by 10°C
(c) The temperature has cooled from 9°C by 15°C
(d) The temperature has cooled from 8°C by 11°C
(e) The temperature has cooled from 1°C by 6°C



We can also work out how many degrees temperature has dropped.

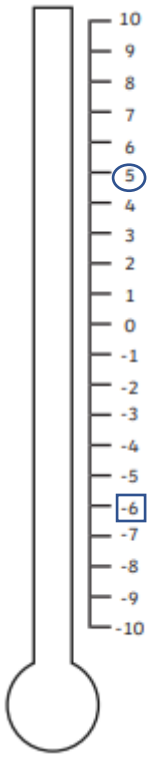
Did you know…

Water freezes at 0°C so at -6°C water would be ice.

For example,

Water is cooled from 5°C to -6°C, by how many degrees has the temperature dropped?

If you mark both temperatures on the thermometer, you can count how many jumps you would need to make to get from 5°C to -6°C.

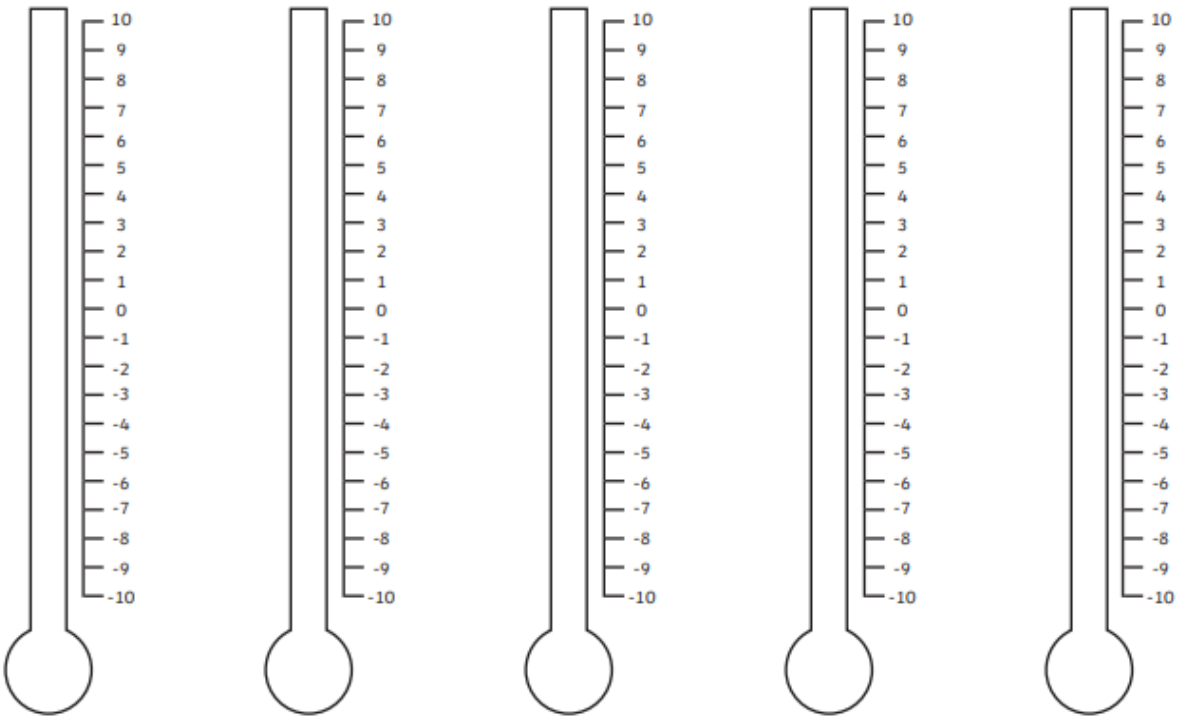


Answer = 11°C

Another way of doing this is 5 – (-6) which becomes 5 + 6 = 11

How many degrees has the temperature dropped in every case? You can use the thermometers to help.

(a) A liquid is cooled from 6°C to -7°C
(b) A liquid is cooled from 4°C to -2°C
(c) A liquid is cooled from 10°C to -9°C
(d) A liquid is cooled from 6°C to -7°C



How did you get on?

- ✓ Do you understand how the number line extends to negative numbers?
- ✓ Did you mark the numbers on the scale and count the jumps?
- ✓ Did you remember the units?

Now you're ready to try assessment question 8

Triangles

Learning Intention

To measure sides and angles of triangles

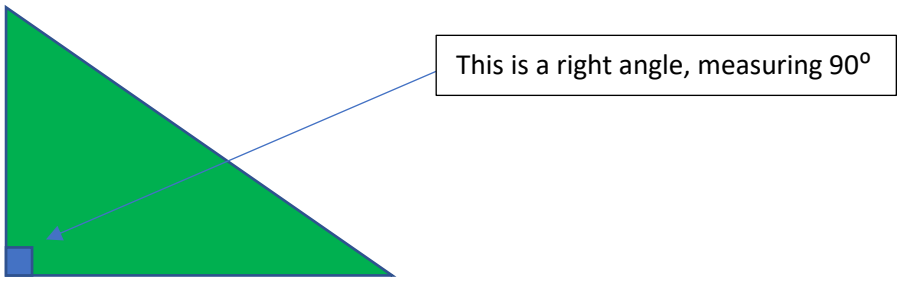
Success Criteria

- ✓ Use a ruler to measure the side – start at 0cm
- ✓ Use a protractor to measure the angle – start at 0^o
- ✓ Remember the units

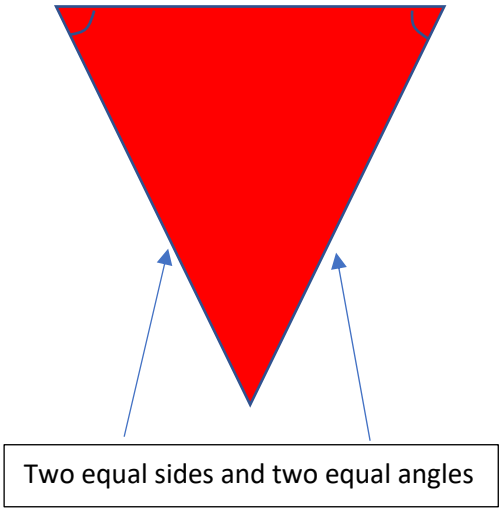
As you know, any 3 sided shape is called a triangle.

There are some special types of triangles:

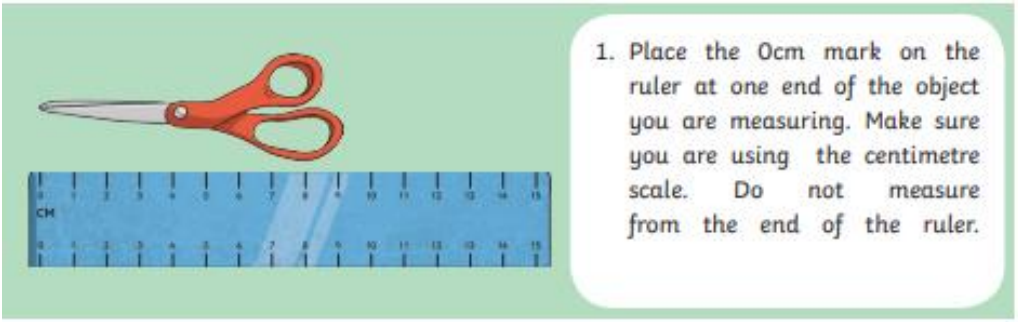
Right angled



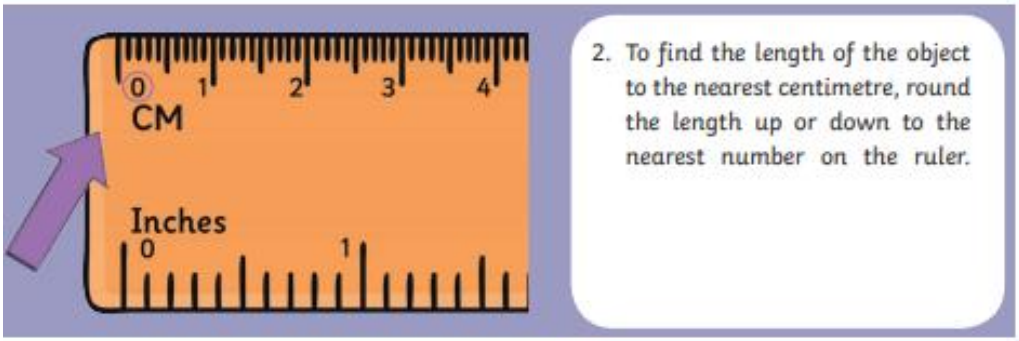
Isosceles



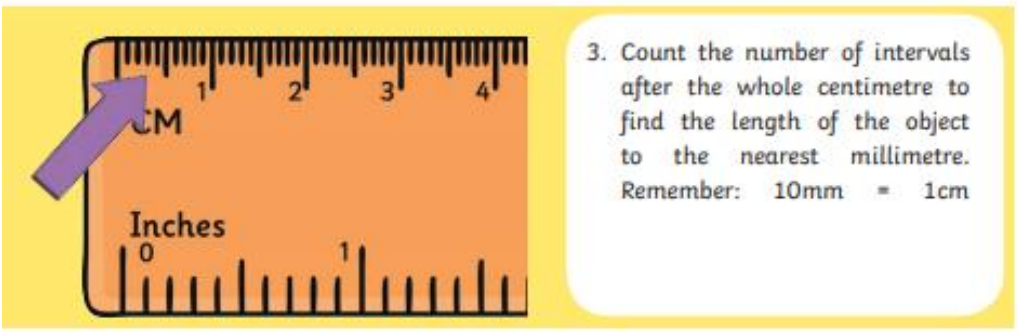
To measure the side of a triangle we use a ruler, here are some tips for using a ruler:



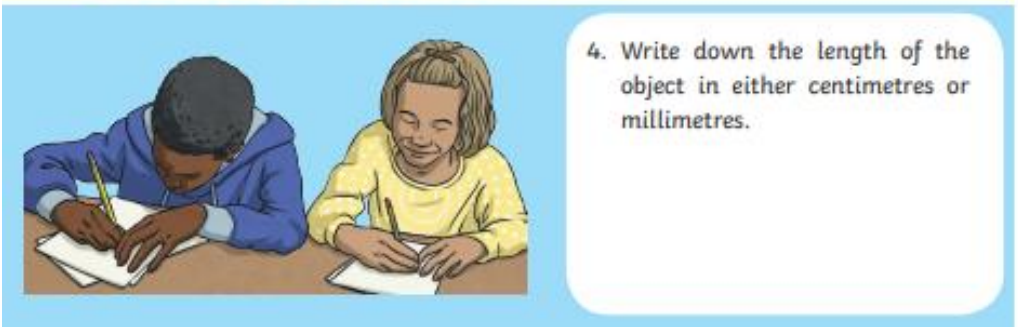
1. Place the 0cm mark on the ruler at one end of the object you are measuring. Make sure you are using the centimetre scale. Do not measure from the end of the ruler.



2. To find the length of the object to the nearest centimetre, round the length up or down to the nearest number on the ruler.



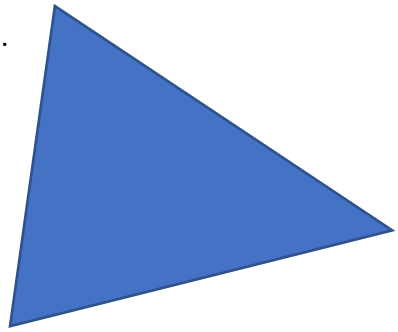
3. Count the number of intervals after the whole centimetre to find the length of the object to the nearest millimetre. Remember: 10mm = 1cm



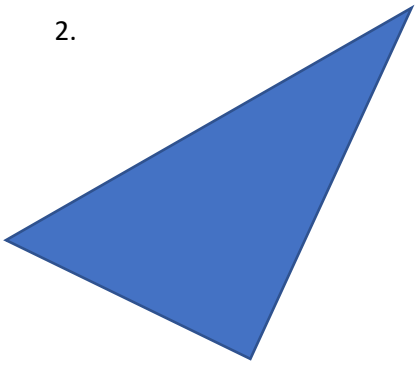
4. Write down the length of the object in either centimetres or millimetres.

Now use your ruler to measure the sides of these triangles:

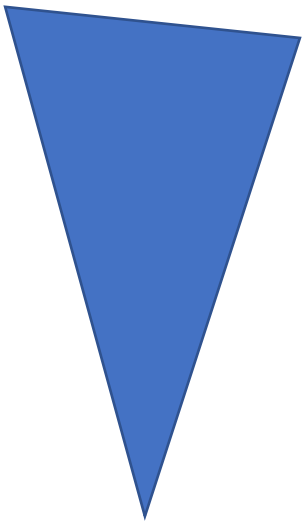
1.



2.



3.



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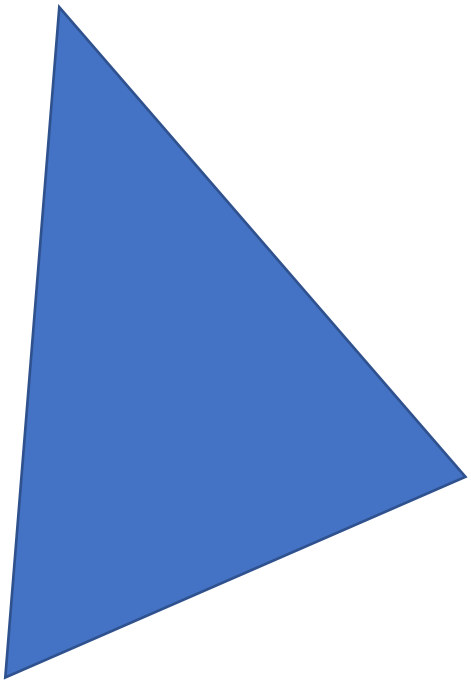

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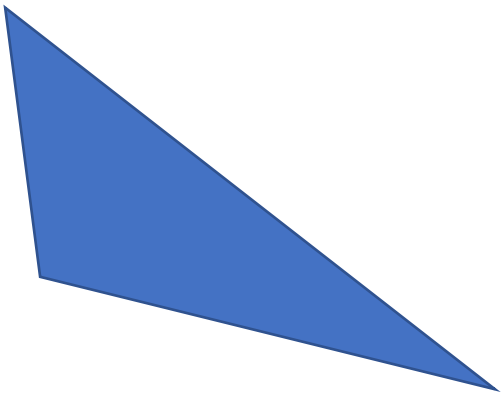

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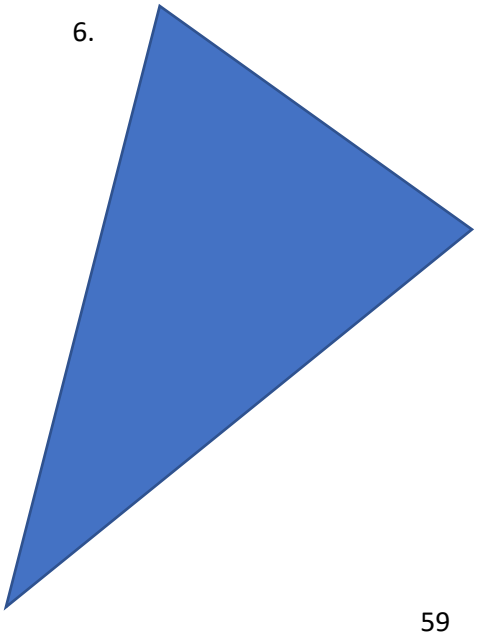
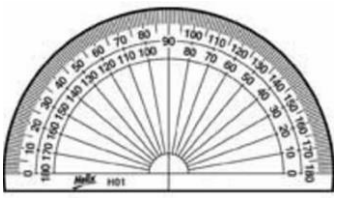
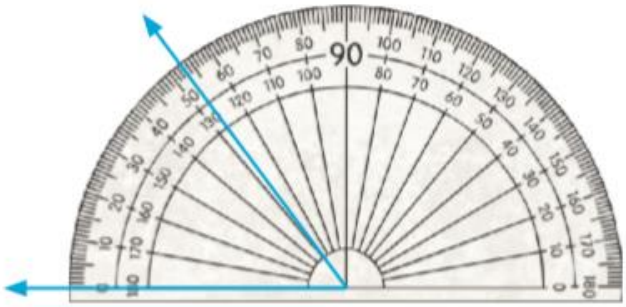


To measure an angle, we need to use a protractor. A protractor looks like:



A protractor has 2 scales, one on the outside which goes from 0^o to 180^o clockwise and another on the inside which goes from 0^o to 180^o anticlockwise. You need to make sure that you are using the correct one.

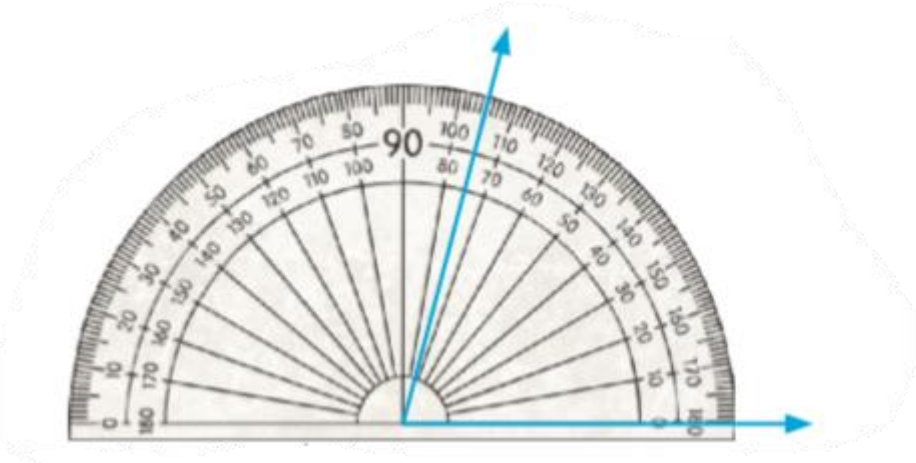
Example 1



The blue lines show the angle that we are measuring.

Here we are using the outside scale, looking at the blue lines: one of them is at 0^o and the other is at 53^o. This means that the size of the angle is 53^o.

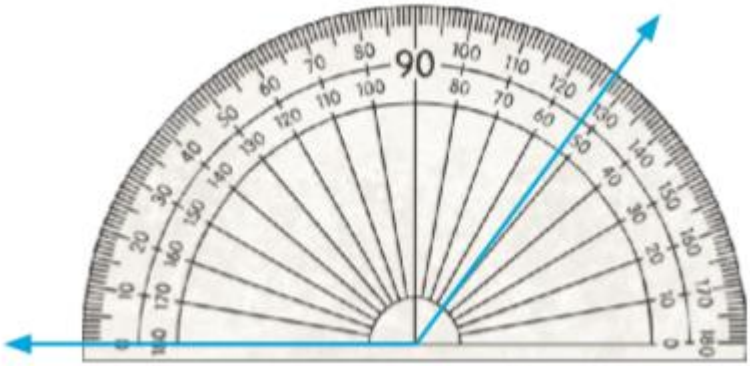
Example 2



Here we are using the inside scale. One of the blue lines is at 0^o it goes anti-clockwise and the other blue line is half way between 70^o and 80^o so the angle is 75^o.

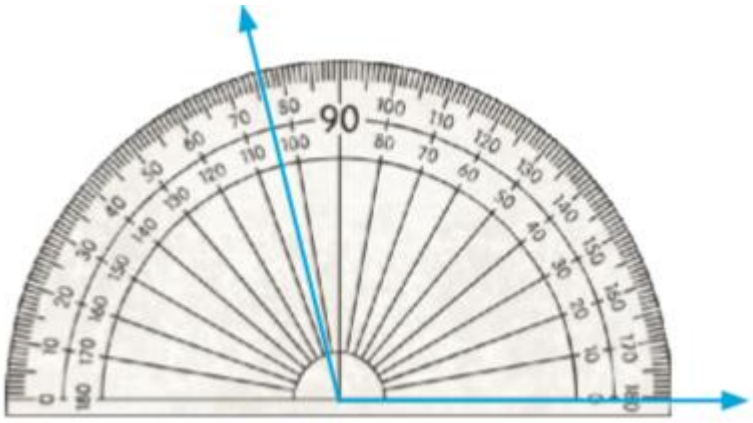
Now, look at the protractors below to measure the angles. Remember angles are measured in degrees so you need to use the ^{o} symbol.

1.



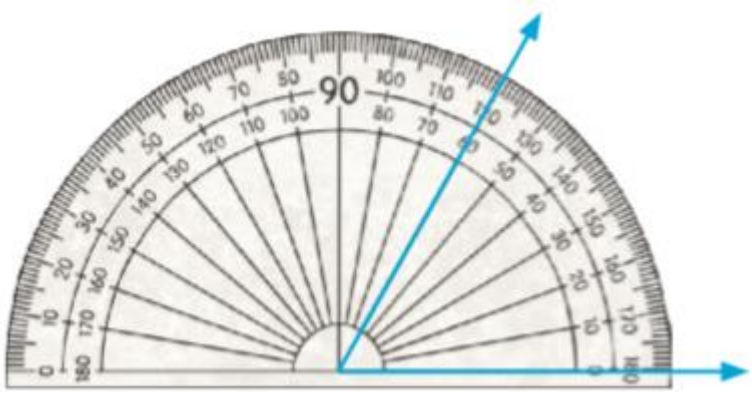
Answer:……..

2.



Answer:……..

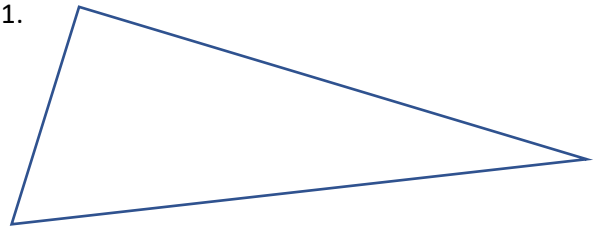
3.



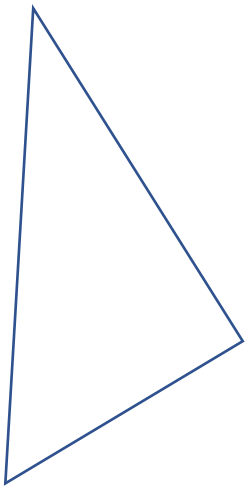
Answer:……..

Now use your protractor to measure the sizes of all the angles in the triangles below. Write your answers next to each angle.

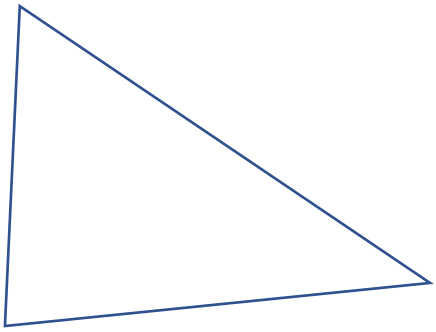
1.



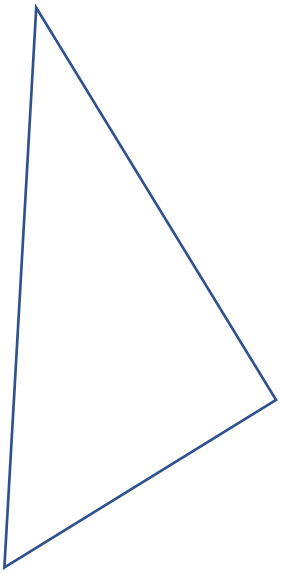
2.



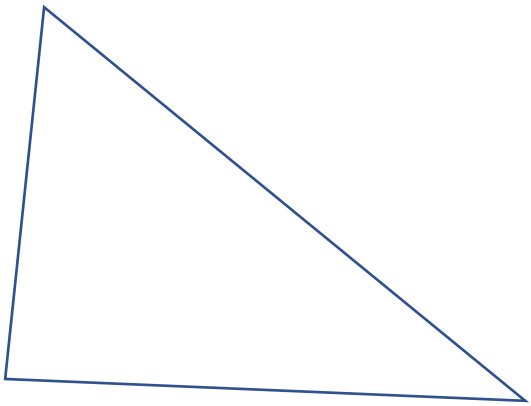
3.



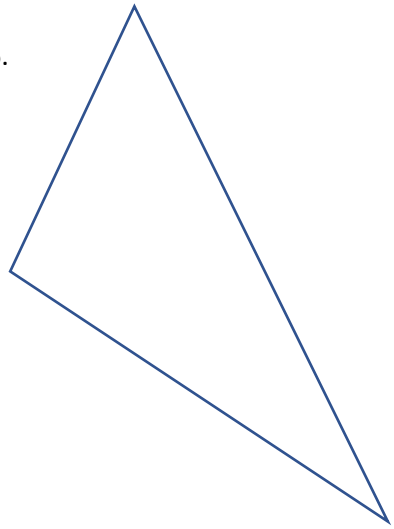
4.



5.



6.



How did you get on?

- ✓ Did you use a ruler to measure the sides – starting at 0cm?
- ✓ Did you use a protractor to measure the angles – starting at 0^o?
- ✓ Did you remember the units?

Now you're ready to try assessment question 11

Foreign Exchange

Learning Intention

To convert between GBP and other currencies

Success Criteria

- ✓ Use correct exchange rate
- ✓ Multiply to change £ to other currencies
- ✓ Divide to change other currencies to £
- ✓ Use the correct units

In Britain, we use the GBP (Great British Pound - £), however in other countries they use different currencies. Most European countries use the Euro, America uses the Dollar. We need to be able to convert between them.

We use exchange rates to determine how much of another currency is the same value as £1.

To change from £ to other currencies we MULTIPLY by the exchange rate.

Exchange Rates
£1 = €1.12 (All Europe)
£1 = $1.31 (America)
£1 = $1.82 (Australia)

Remember – money has 2 decimal places!

If the calculator gives you more than 2 decimal places you need to round.

For example,

Barry went to Spain, he changed £250 into Euros before he left. How many Euros did he get?

250 x 1.12 = €280

Lucy went to America and changed £400 into Dollars. How many Dollars did she get?

400 x 1.31 = $524

Try the following questions, remember to multiply by the correct exchange rate. Use the exchange rates in the box above.

Question	Working and Answer
Michael went to visit his family in Australia, he changed £1200 into Australian Dollars. How many Australian Dollars did he get?	

Tom went to Portugal for a golfing holiday. He changed £350 to Euros, how many Euros did he receive?	
Mel went to New York and changed £650 to American Dollars before she left. How many American Dollars did she receive?	
The Smiths went to Florida on holiday and changed £1500 to American Dollars before they left. How many Dollars did they receive?	
Holly and her friend Sarah took a trip to Barcelona. They converted £500 to Euros before they left. How many Euros did they get?	

We can also convert other currencies to GBP by DIVIDING by the exchange rate.

For example,

Kate returned from Paris with €65. How much is this is in £?

65 ÷ 1.12 = £58.04

Now try the following questions using the same exchange rates.

Question	Answer
I brought $142 back from America, how much us this in £?	

Sara came home from a work trip to France. She brought home €56. How much is this in £?	
Michael and his family came from Australia to Scotland with $1500. How much is this in £?	
The Nelsons from America visited family in England. They brought $1200 with them. How much is this in £?	

How did you get on?

- ✓ Did you use correct exchange rate?
- ✓ Did you multiply to change £ to other currencies?
- ✓ Did you divide to change other currencies to £?
- ✓ Did you use the correct units?

Now you're ready to try assessment question 3

Scales

Learning Intention

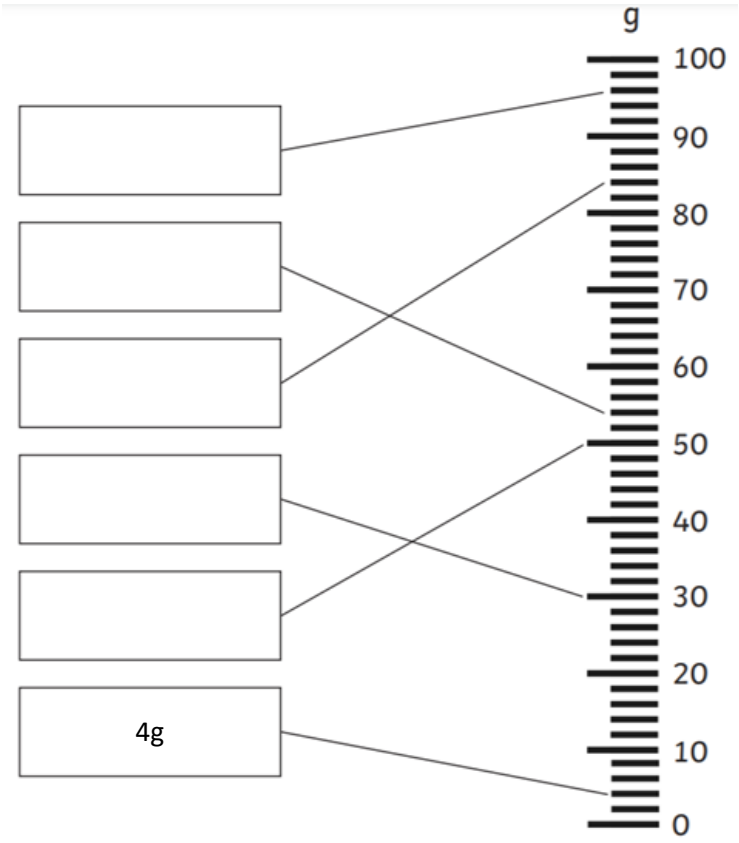
To interpret scales accurately

Success Criteria

- ✓ Work out the increments that scale goes up in
- ✓ Interpret what the scale points to
- ✓ Solve problems involving scale
- ✓ Remember your units

Scales are very useful as they display measurements of weights, liquids and temperatures.

When we read scales, we must first work out what the scale is going up in (the increments). With this scale below, can you see that 0 is marked at the bottom and there's 5 little sections until you get to 10? This means that the scale goes up in 2s so every little line is 2. Try to complete the boxes below, the first one is 4g.

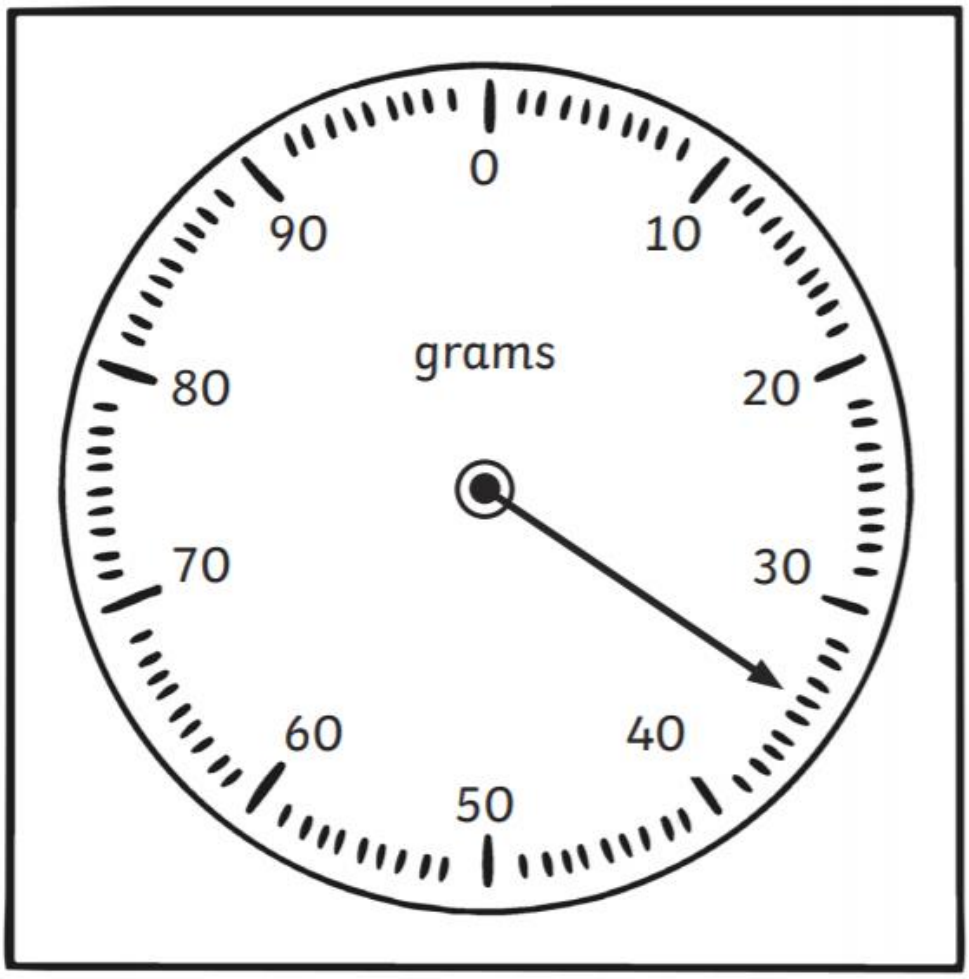


Scales can be circular like the one below. As we did with the last question, we need to work out what the scale goes up in. Here there are 10 little sections between 0 and 10 so each little section is 1.

What is the scale pointing to?

Now use a ruler to draw arrows on the scale to show:

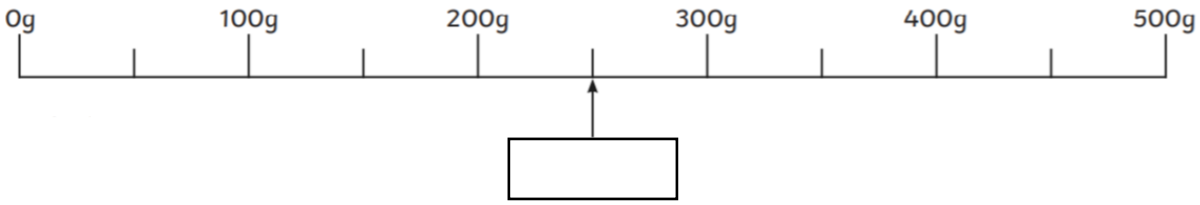
a) 22g
b) 48g
c) 65g
d) 7g
e) 99g



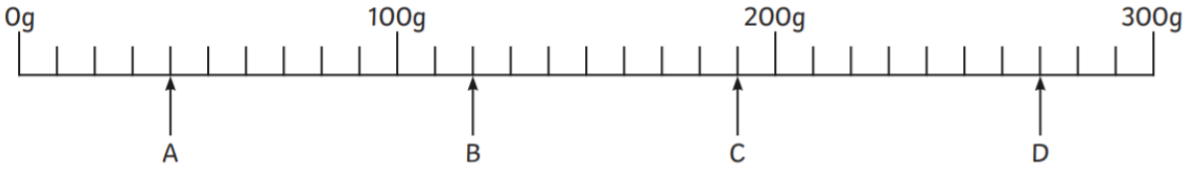
Now try the following scales:

Remember to work out what the scales go up in.

Q1



Q2

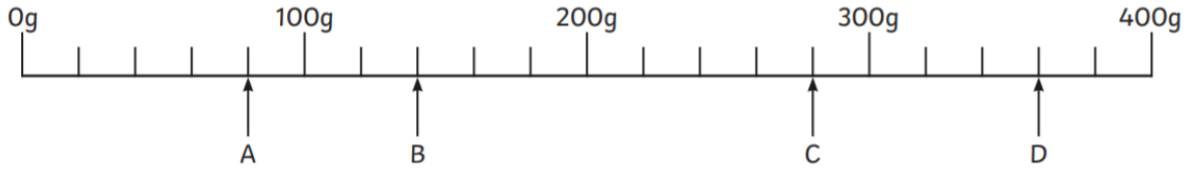


A	
B	
C	
D	

Q3

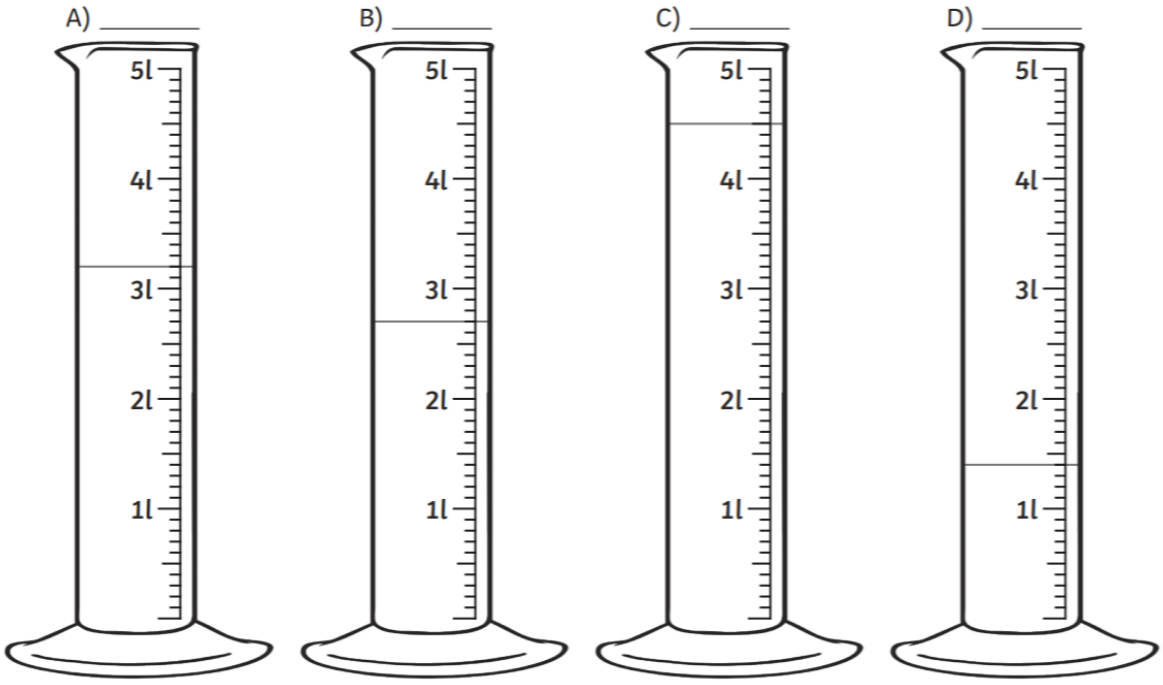
A	
B	
C	
D	

Q4



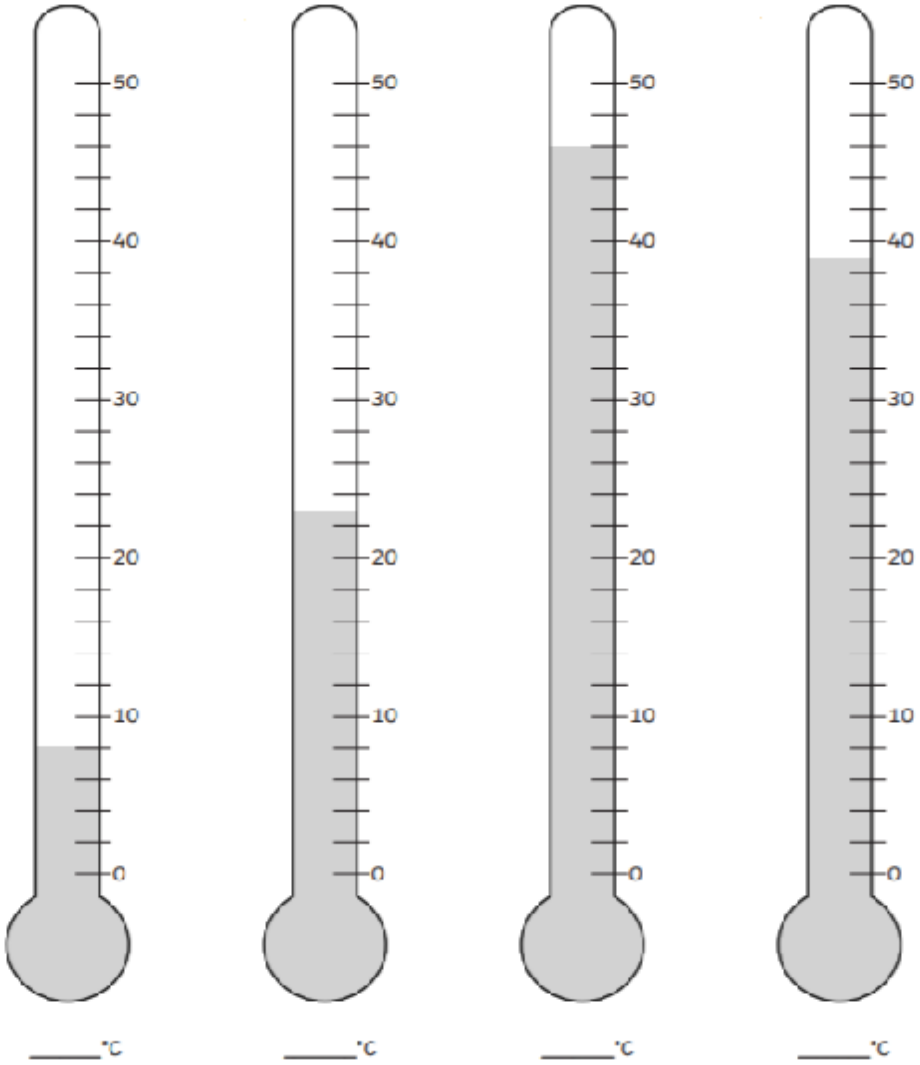
A	
B	
C	
D	

Q5



A	
B	
C	
D	

Q6



We can also be asked how much more needs to be added to make up to a certain amount.

For example,

Some water has been added to this jug, how much more needs to be added to make it up to 400ml?

There is 260ml in the jug.

400 – 260 = <u>140ml</u> more needs to be added.

Now try the following:

1. How much more water needs to be added to make this up to 500ml?

Answer

2. How much more water needs to be added to make this up to 500ml?

Answer

3. How much more water needs to be added to make this up to 750ml?

Answer

4. How much more water need to be added to make this up to 2l?

   Hint: Remember there are 2000ml in 2l.

Answer

5. How much more water need to be added to make this up to 2l?

   Hint: Remember there are 2000ml in 2l.

Answer

How did you get on?

- ✓ Did you work out the increments that scale goes up in?
- ✓ Did you interpret what the scale points to?
- ✓ Did you solve problems involving scale?
- ✓ Did you remember your units?

Now you're ready to try assessment question 9

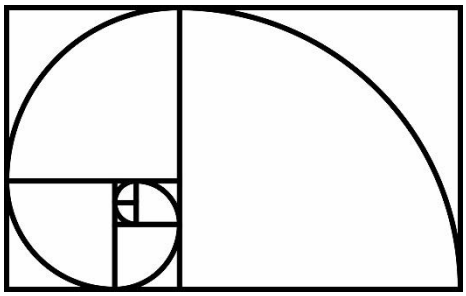
Ratio

Learning Intention

To use ratios to solve problems

Success Criteria

- ✓ Work out the ratio
- ✓ Simplify ratios
- ✓ Solve problems involving ratio
- ✓ Remember your units



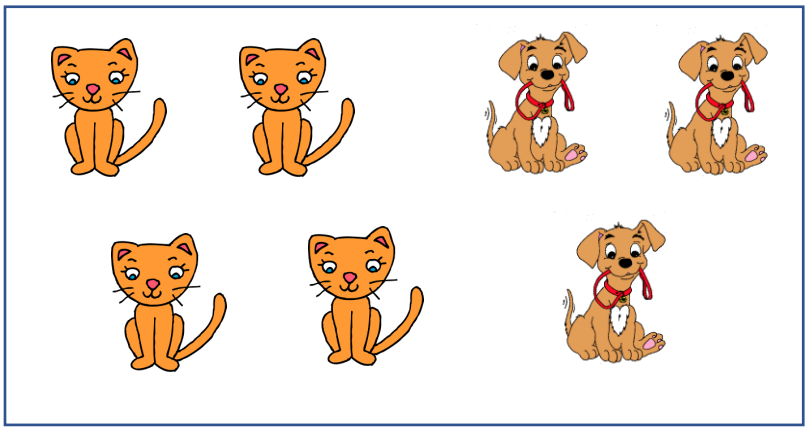
We use ratios to compare different quantities.

: is the symbol for ratio

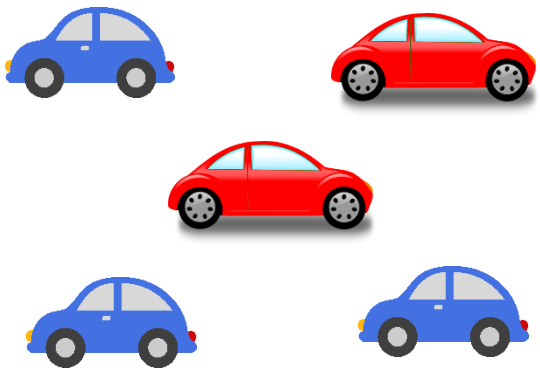
For example,

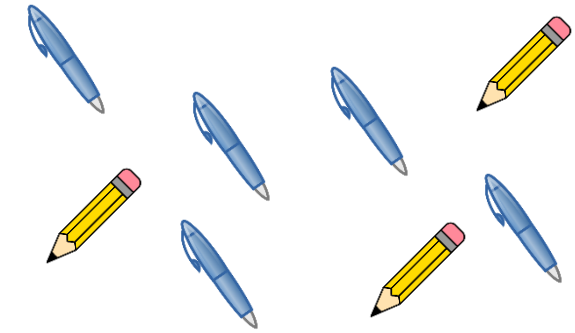
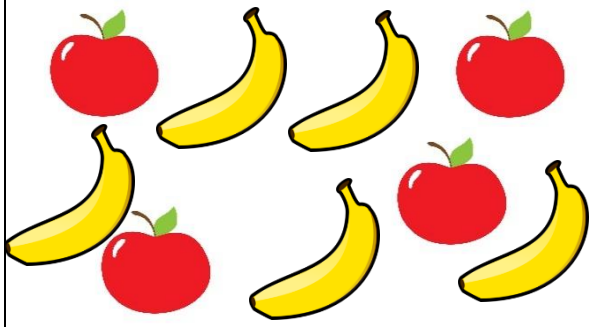
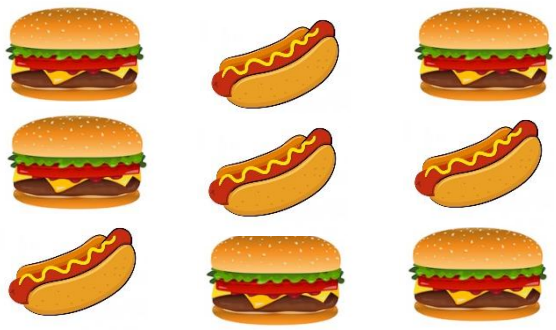
The picture below shows 4 cats and 3 dogs. What is the ratio of cats and dogs?

So, we say the ratio of cats to dogs is 4 : 3, and the ratio of dogs : cats is 3 : 4.



Look at the pictures below and write the ratios both ways in the box opposite:

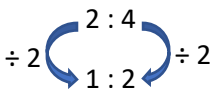
Pictures	Ratios
	Blue car : Red car 3 : 2 Red car : Blue car 2 : 3

Sometimes, we get ratios that we need to simplify.

For example,

2 : 4 we can simplify this by dividing both sides by 2 to get 1 : 2



It’s very important to divide both sides by the SAME number!!

Now try to simplify the following ratios by dividing both sides by the SAME number:

Ratio	Simplified Ratio
4 : 6	2 : 3
10 : 8	
3 : 6	
9 : 3	
5 : 15	
10 : 2	
100 : 10	
15 : 20	
18 : 9	
16 : 8	
24 : 6	
11 : 77	
8 : 16	
3 : 12	

Now try the following wordy questions, you are simplifying the ratio, just as before:

Question	Answer
A concert arena uses 5 security people for every 1000 spectators. (a) What is the ratio of spectators to security people? (b) Give this ratio in its simplest form.	
The same concert arena has 10 VIP parking spaces for every 120 ordinary spaces. (a) What is the ratio of VIP spaces to ordinary spaces? (b) Give this ratio in its simplest form.	
There are 20 desks and 24 chairs in a room. (a) What is the ratio of desks to chairs? (b) Give this ratio in its simplest form.	
There are 25 shop assistants and 150 shoppers. (a) What is the ratio of shop assistants to shoppers? (b) Give this ratio in its simplest form.	
In a class there are 30 students and 2 adults. (a) What is the ratio of students to adults? (b) Give this ratio in its simplest form.	
In an office, the manager earns £24,000 and the salesman earns £18,000 each year. (a) What is the ratio of the manager's earnings to the salesman's earnings? (b) Give this ratio in its simplest form.	

We can do calculations with ratios; this is the opposite of simplifying ratios.

For example,

To make purple paint, the shop mixes red and blue paint in the ratio red : blue = 3 : 4. For a large order the shop use 15 tins of red paint. How many blue tins are required?

Red : Blue

x 5 (because 3 x 5 = 15) 3 : 4 → 15 : 20 4 x 5 = 20

<u>20 tins of blue paint are required</u>

Now try the following:

Question	Working and Answer
A different shade of purple uses red and blue paint in the ratio 2 : 3. If 8 tins of red paint are used, how many blue tins are needed?	
In a cat and dog shelter the ratio of cats : dogs is 5 : 4. If there are 40 cats, how many dogs are there?	
Mr Robertson is a PE teacher and is ordering footballs and rugby balls in the ratio footballs : rugby balls 3 : 4. If he orders 16 rugby balls, how many footballs did he order?	
June is making a bouquet of flowers in the ratio carnations : roses 3 : 5. How many carnations will she need if she has 15 roses?	

Another type of calculation is dividing an amount into a certain ratio.

For example,

£10 is split between two siblings in the ratio John : Jaime, 2 : 3. How much does each person get?

Here John gets 2 parts and Jaime gets 3 parts. First step is to calculate how many parts there are so 2 + 3 = 5.

Then we divide £10 ÷ 5 = £2. So, each part is £2.

John gets 2 x £2 = £4

Jaime gets 3 x £2 = £6

Notice £4 + £6 = £10, which is what we started with.

Another example,

140 eggs are split between two shops in the ratio Key Store : Nisa, 3 : 4. How many eggs does each shop get?

3 + 4 = 7

140 ÷ 7 = 20 eggs

Key Store gets 3 x 20 = 60 eggs

Nisa gets 4 x 20 = 80 eggs

Notice 60 + 80 = 140 eggs, which is what we started with.

Now try the questions below:

Question	Working and Answer
Sharon is painting her house. She has calculated she needs 40 litres of paint in total. She has decided to mix pink paint. She will need 3 litres of white for every 2 litres of red. How many litres of each colour will she need to buy?	
In the school choir, there are 30 children. The ratio of girls to boys is 4:1. How many boys are in the choir?	

Tasneem brings some sweets to school on her birthday. In the bag, there are chocolates and toffees. The ratio of chocolates to toffees is 5:3. If there are 40 sweets, how many are chocolates?	
A bag of sweets contains red sweets and yellow sweets. The ratio of red to yellow is 3:7. If there are 40 sweets altogether, how many yellow sweets are there?	
Jack has 30 sweets. He shares his sweets with his friend. When he gives his friend 1 sweet, he has 2 for himself. (a) How many sweets do they each have? *Hint: Jack : Friend is 2 : 1* (b) Jack gives his friend 12 sweets. Is this the correct amount?	
Lucy has a necklace which has red beads and blue beads. For every red bead, there are four blue beads. There are 20 beads in total. (a) How many of these are blue? *Hint: Red : Blue is 1 : 4* (b) Lucy has 15 blue beads, is this enough?	

How did you get on?

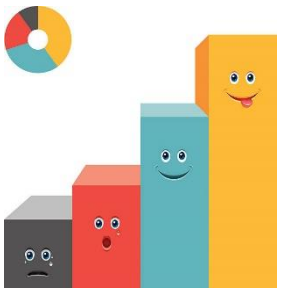
- ✓ Did you work out the ratio?
- ✓ Did you simplify ratios?
- ✓ Did you solve problems involving ratio?
- ✓ Did you remember your units?

Now you're ready to try assessment question 7

Information Handling

Learning Intention

To interpret graphs, charts and tables and be able to answer questions on them

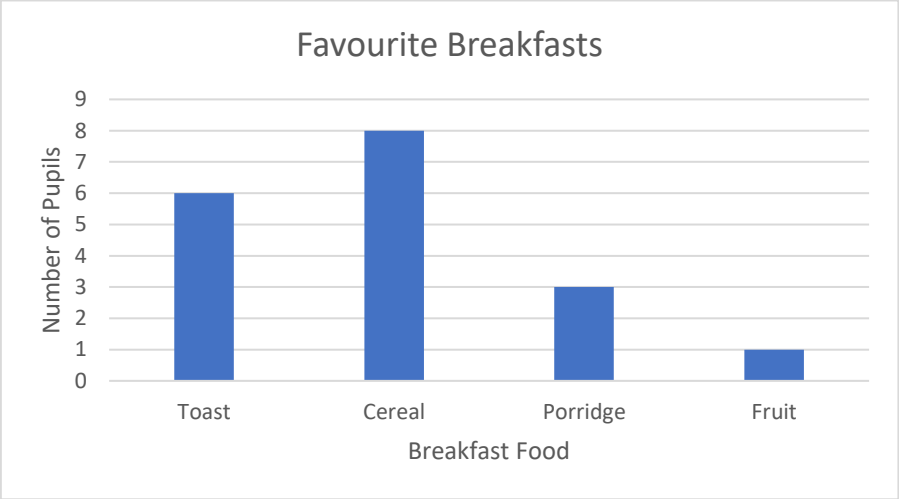


Success Criteria

- ✓ Understand how to read graphs, charts and tables
- ✓ Read scales correctly
- ✓ Answer questions based on the graphs, charts and tables

Bar Charts

In the Manage Finance and Statistics unit, we organise data into frequency tables and draw graphs. In this unit, we interpret that information. Bar Charts are a good way of displaying information and look like:



This displays the information gathered from a survey on what pupils liked for breakfast in Breakfast Club.

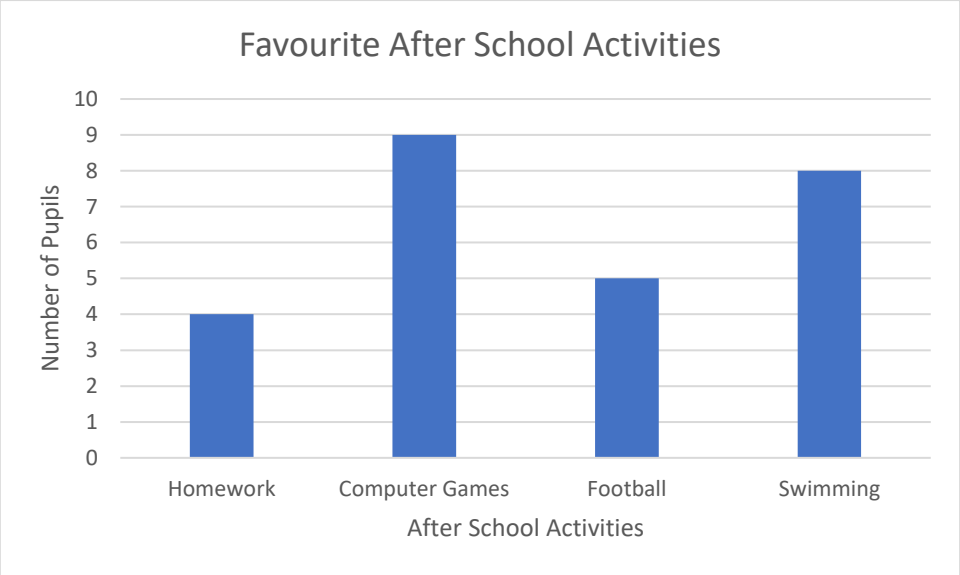
We can see that the most popular choice of breakfast is cereal with 8 pupils choosing this option.

The least popular choice was fruit with just 1 pupil choosing this option.

(a) How many pupils chose porridge?

(b) How many more pupils chose toast than fruit?

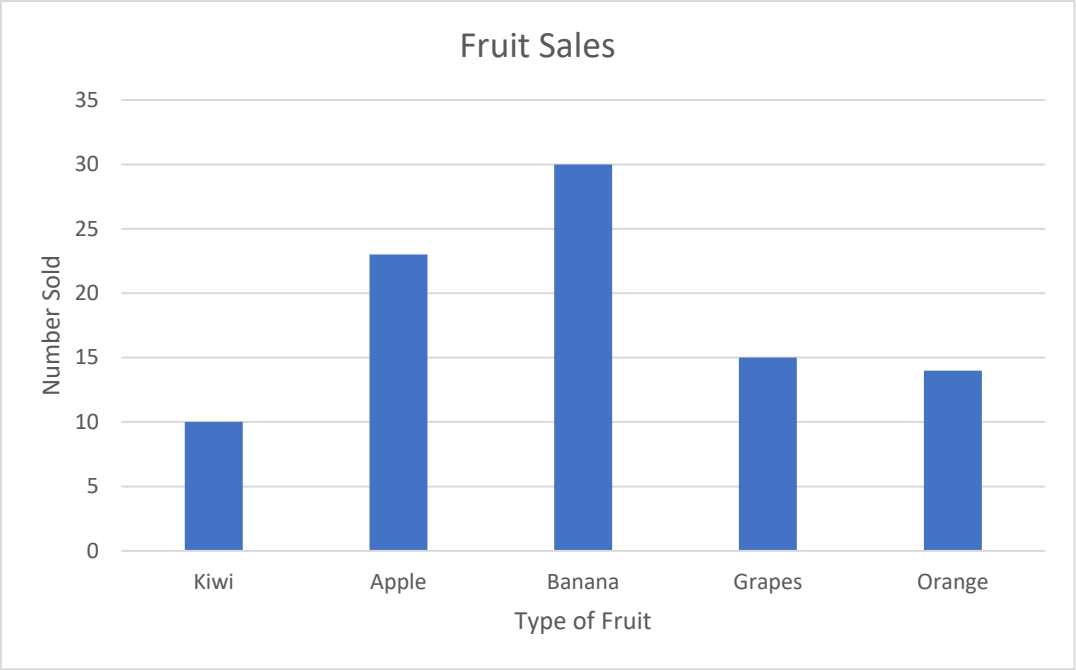
1. Below is a bar chart showing favourite after school activities:



Now answer the following questions based on the bar chart:

Question	Answer
What is the most popular activity?	
What is the least popular activity?	
How many pupils chose football?	
How many more chose swimming than homework?	
How many pupils were asked altogether?	

2. Below is a graph of fruit sold in a supermarket.

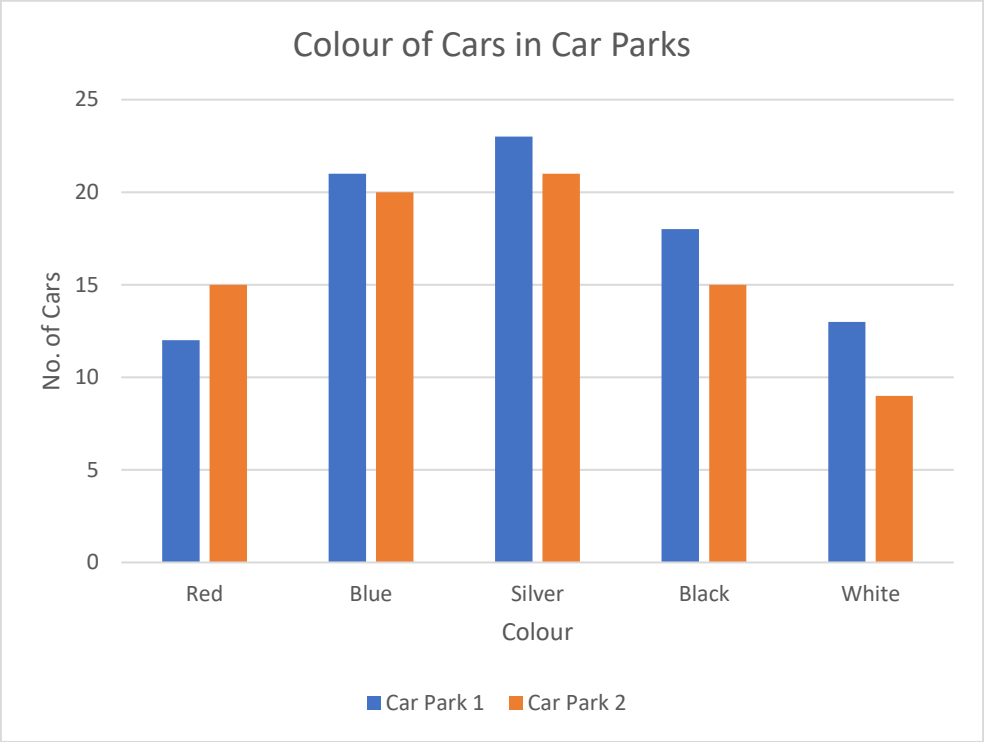


Now try some questions based on the bar chart:

Question	Answer
How many of each fruit were chosen?	**Fruit** / **Number** Kiwi Apple Banana Grapes Orange
How many more apples than oranges were sold?	
What was the most popular fruit?	
How many pieces of fruit were sold altogether?	

The following ar charts show two lots of information on the same graph so that we can compare them:

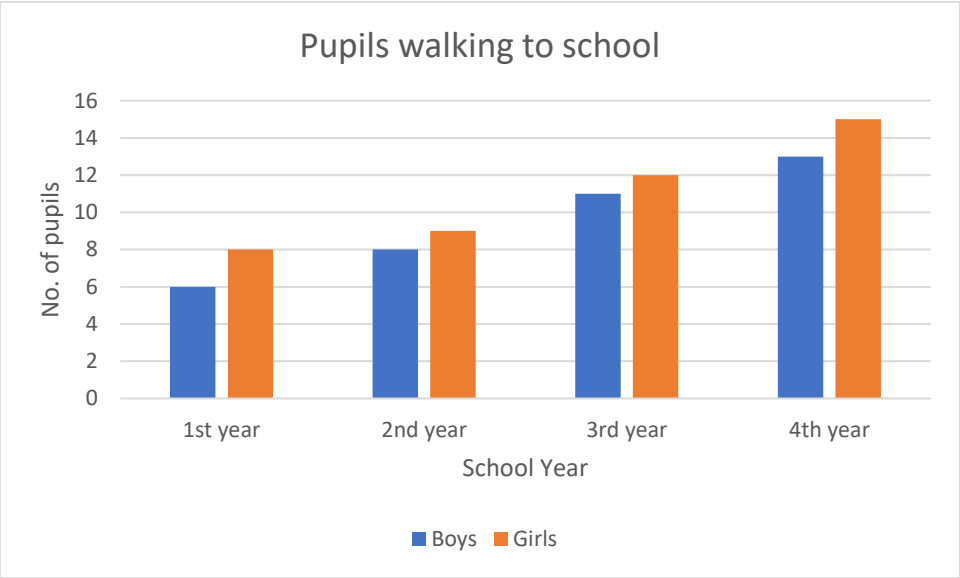
3. A survey was done on the colours of cars in two car parks. Here is a bar chart of the results:



Now try the questions below:

Question	Answer
How many of each colour of car were in Car Park 1? *Hint: This is the blue bars*	**Colour** / **Number** Red Blue Silver Black White
How many silver cars were in Car Park 2?	
Compare the colours of cars in the car parks.	

4. A survey was done on the number of pupils in each year group who walk to school, here are the results:



Now try the questions below:

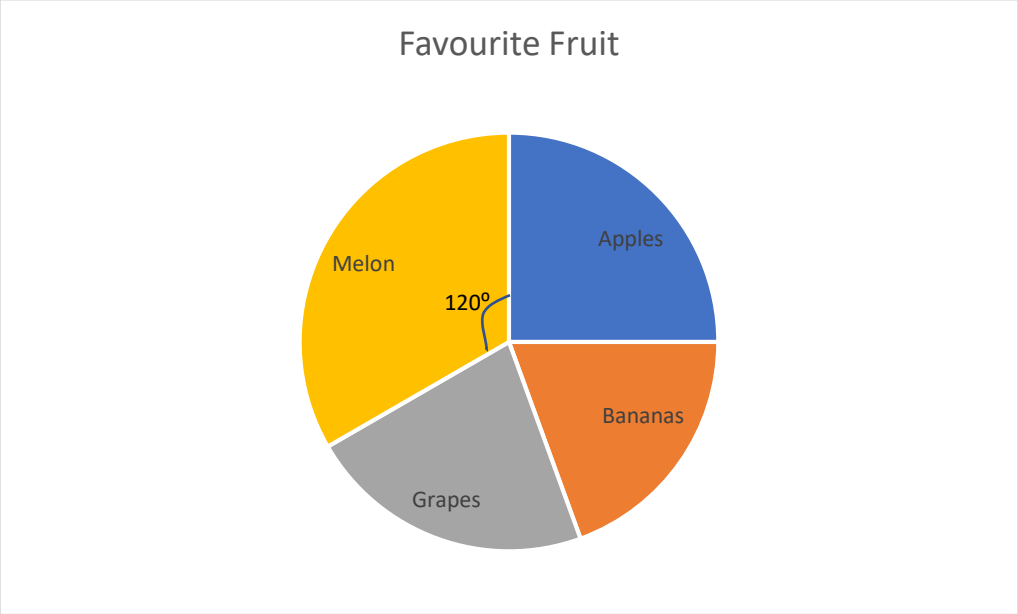
Question	Answer
How many S2 girls walked to school?	
How many S4 boys walked to school?	
Compare the number of boys and girls who walk to school across the year groups.	

Pie Charts

Pie Charts are another way of displaying data. We can interpret this data.

For example,

The pie chart below shows the results from a survey on S5's favourite fruit. 36 people were asked, how many people chose melon?



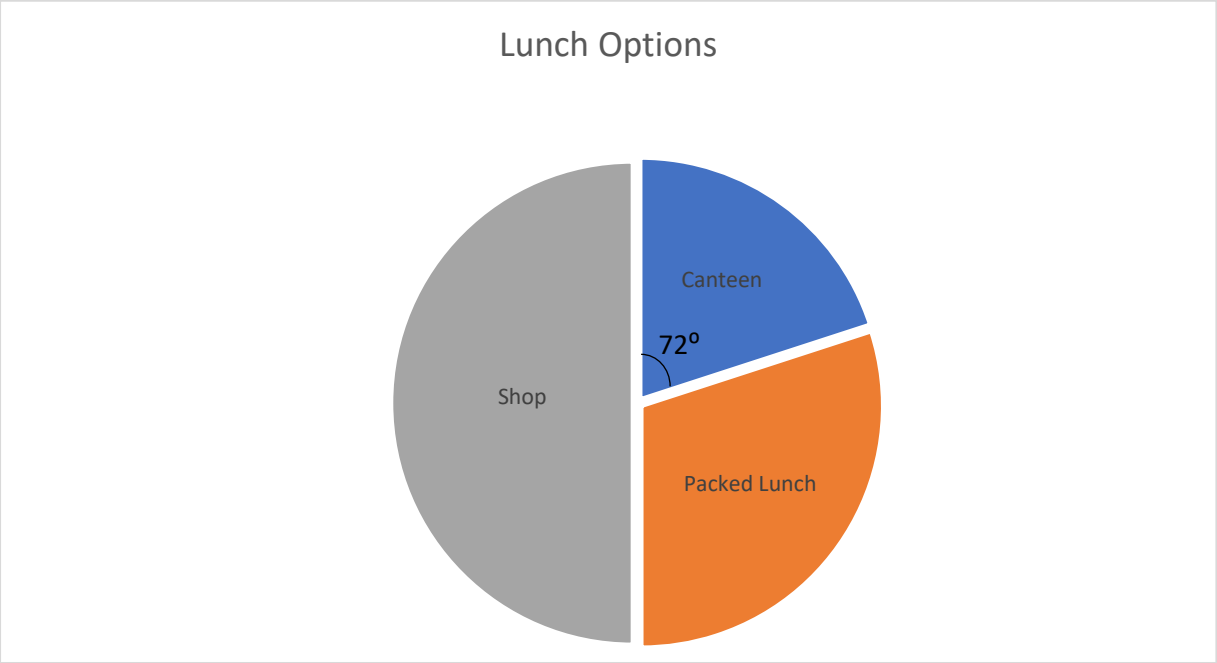
Looking at the melon slice in the pie chart, we can see that it's 120°, you may remember that a full circle is 360° so we need to divide by 360.

Then since there are 36 people in the survey, we need to multiply by 36.

Melon = 120 ÷ 360 x 36

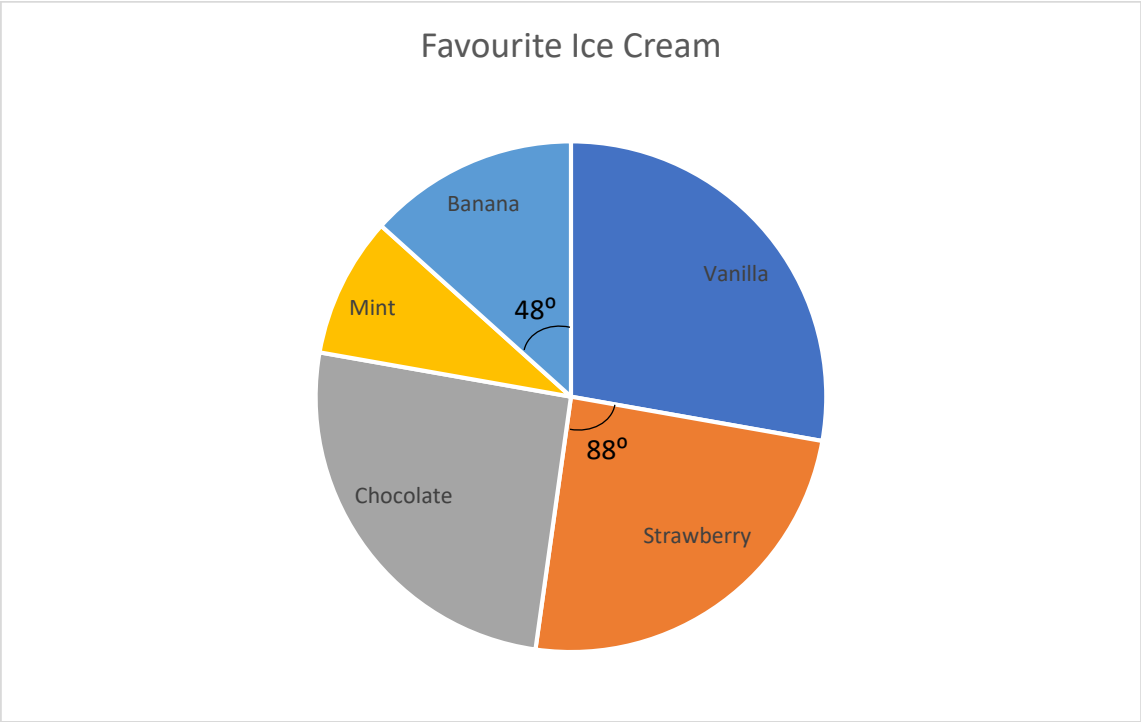
= 12 people

1. A survey was carried out on where college students buy their lunch, the results are shown in the pie chart below.



Question	Working and Answer
150 students were asked. How many students ate in the canteen?	

2. Pupils were asked what their favourite ice cream is and the results are shown in the pie chart below:



Quesiton	Working and Answer
90 people were asked, how many people choose Strawberry as their favourite?	
90 people were asked, how many people choose Banana as their favourite?	

Tables

Sometimes information is displayed in a table and we need to be able to interpret this information.

For example:

Here are results from a long jump competition, all measurements in cm:

	1st Jump	2nd Jump	3rd Jump	4th Jump
Abby	145	164	154	187
Karla	187	197	168	201
Stacey	149	168	179	189
Flo	155	175	187	177

(a) How far did Karla jump on her 2nd jump?

Looking at the table, go along Karla's row until you get to her 2nd jump, 197cm.

(b) Who won the competition?

We're looking for the longest jump so 201cm – Karla won.

(c) Who improved with every jump?

Looking at the table, Stacey jumps further every time so she improved with every jump.

1. The table below shows who is able to babysit on which nights:

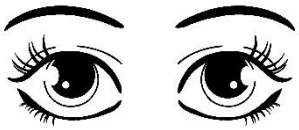
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Clare	✓			✓		✓	
Rebecca		✓				✓	
Carol	✓		✓		✓	✓	✓
Michael			✓	✓	✓		

Looking at the table, answer the following questions:

Question	Answer
What nights can Clare babysit?	
Who can babysit on a Wednesday night?	
Who can babysit on the most nights?	
Which nights have the least choice for a babysitter?	
Which night has the most choice for a babysitter?	
Who could babysit on a Friday if Carol is unavailable?	

2. The table below shows eye colour information for pupils in S6:

Eye Colour	Number of boys	Number of girls
Blue	7	8
Brown	5	6
Green	2	4



Now answer the following questions:

Question	Answer
How many boys have green eyes?	
How many girls have blue eyes?	
How many girls are in the class?	
How many pupils have brown eyes?	
How many pupils are in S6 altogether?	

3. Below is a table shows some college students.
   It shows their age, height and the distance they live from college.

	Age	Height (cm)	Distance from college (miles)
Anya	24	164	2
Nathan	22	178	4
Sarah	26	170	3
Lucy	19	168	1

The college is launching a project and is looking for students to take part. They need someone who is 24 or younger, taller than 165cm and lives 2 miles or less from college.

Question	Answer
Who can take part in this project?	
Why can't the others take part?	

How did you get on?

- ✓ Do you understand how to read graphs, charts and tables?
- ✓ Did you read scales correctly?
- ✓ Did you answer questions based on the graphs, charts and tables?

Now you're ready to try assessment questions 12, 13, 14 and 15.

Probability

Learning Intention

To calculate and compare probabilities of events happening

Success Criteria

- ✓ Understand what probability is
- ✓ Calculate probabilities
- ✓ Compare the probabilities and solve problems involving probability

The probability of something happening can be thought of as a fraction or decimal, and is calculated using the following formula:

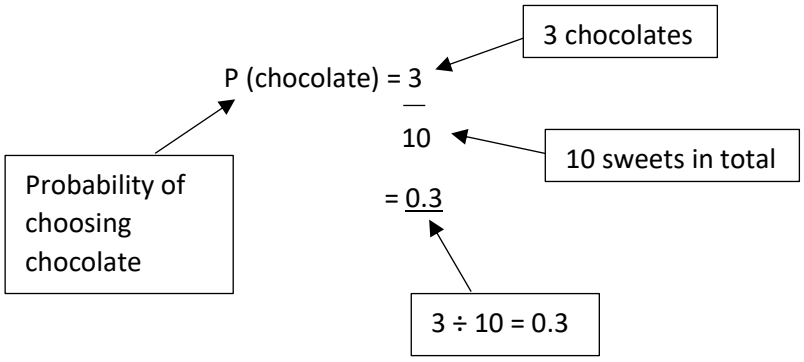
$$\text{Probability of event happening} = \frac{\text{Number of favourable ways}}{\text{Number of possible ways}}$$

Probabilities are numbers between 0 and 1.

0 is 'definitely not gong to happen' and 1 is 'definitely going to happen'

For example,

In a bag of 10 sweets, 3 are chocolate and 7 are toffee. What is the probability that a sweet chosen at random will be a chocolate?



Try the following questions:

Question	Working and Answer
In a bag of 5 balls, there are 2 yellow balls and 3 red balls. What is the probability that a ball chosen at random will be yellow?	
In a box of 12 lollies, 3 are strawberry flavour. What is the probability that a lolly NOT strawberry flavoured will be chosen at random? *Hint: If 3 are strawberry, 9 are not strawberry*	
On a regular dice (which has numbers 1-6), what is the probability that it will show a 2?	
On a regular dice (which has numbers 1-6), what is the probability that it will show a number 3 or below?	

We can also compare probabilities to decide which is event is more likely.

For example,

A box has 3 yellow balls and 4 red balls

A jar has 5 yellow balls and 6 red balls

If I choose a ball at random from either the box or jar, which gives the best chance of choosing a yellow ball?

First, we have to calculate the probabilities:

Box – P(yellow) = $\frac{3}{7}$ = 0.43 Jar – P(yellow) = $\frac{5}{11}$ = 0.45

The jar gives the best chance of choosing a yellow ball.

Now try the following questions:

Question	Answer
Two football teams are having a match and each team is given tickets for their fans. Team A has 43 fans and has 25 tickets Team B has 36 fans and has 20 tickets Which team has a better chance of their fan getting a ticket?	
Three golfers compare their winning records: Golfer A has won 6 out of his 10 games Golfer B has won 4 out of his 9 games Golfer C has won 7 out of his 12 games. Which golfer has the best winning record?	
Two dancers are in the final of a competition. Dancer A has won 7 out of her last 9 competitions Dancer B has won 6 out of her last 7 competitions. Which dancer has the best winning record?	

How did you get on?

- ✓ Do you understand what probability is?
- ✓ Can you calculate probabilities?
- ✓ Ca you compare the probabilities and solve problems involving probability?

Now you're ready to try assessment questions 16 and 17.