Level 2 Maths

Independent study skills booklet

Learn. To Change.

Contents

General tips – non calculator section

- This section is out of 15 and most questions are 1 mark.
- It is advised you have some plain paper for this section as you'll need to do working out but as a lot of them are only 1 mark, you will find you just put your answer in the box.
- Try to leave 5 minutes at the end to check your work. Checking your work means doing the question again to double check your answer.

General tips – calculator section

- This section is out of 45.
- The first few questions are usually 1–2-mark questions and a lot of the time they ask you to calculate a sum and round to 2 or 3 decimal places.
- It will then move you on to around 7-8 questions which are 3,4-,5- and 6-mark questions. It is important with these questions that you read the question a few times to understand what it is asking.
- You should always be able to do something in these problem-solving questions so please try as you do get method marks. (Remember 6 marks equals six separate steps)
- Try to leave 5 minutes at the end to check your work. Checking your work means doing the question again to double check your answer.

Adding and Subtracting

You need to know when to add or subtract

1. The questions you get in the test will be based on real-life situations
2. You won't always be told when to add or take-away.
3. You will need to work out for yourself and which calculation you need to do.

Example 1

Jack is booking a holiday. Everything he has to pay for is shown below. He gets £50 off the total coast of his holiday for booking online.

How much will the holiday cost Jack?

Flights: £399

4* hotel: £475

Transfers: £50

Step 1: Add up all the prices

£399 + £475 + £50 = £924

Step 2: Take away £50 from your answer.

£924 - £50 = £874

Make sure to include units in your answer, in this case, £.

Exam Type Question

1. Jack has £1200 in his bank. He pays a rent bill of £482 by direct debit. He also pays his electricity bill which is £114. How much has he left in his account?

2. Paula buys a coat for £120 and a dress for £65 on ASOS. She has a voucher for £15 off. How much does Paula pay?

3. Conor sold £850 worth of tickets for a charity event. From this event he has to pay for the hire of the hall at £120, a DJ at £80 and food and drink at £92.50. How much money did he make?

Multiply and Divide

You need to know when to multiply or divide

1. The questions you get in the test will be based on real-life situations
2. You can use a calculator but you won't always be told when to multiply or divide

Example 1

Jack drives a total of 42 miles to and from work each day. In May, he works 22 days. How many miles does Jack drive in May?

Answer: Jack drives 42 miles each day for 22 days.

42 x 22 = 924 miles (Include the units, miles, in the exam.)

Example 2

Gary is organising a trip for his students. The trip costs £480. The cost will be split equally between 20 students. How much will each student pay?

Look for clues — words such as 'split' and 'equally' are linked to dividing.

Answer: The £480 has to be divided between 20 students. So you need to calculate £480 divided by 20.

£480 ÷ 20 = £24 (Include the units, £, in the exam.)

Exam Type Questions

1. You are a member of a football team and they have won £1750 in prize money in a competition. £70 is to be saved for a celebration party; the remainder is to be divided equally between the 14 team members
   How much will you get?

   Answer:

2. You have a new mobile phone. The phone costs £140 and then you pay for a one year contract at £15.75 each month.
   How much do you pay in total for the year?

   Answer:

3. Ryan buys a car costing £8,000. He pays a deposit of £2000 and pays the rest in 20 equal instalments.
   How much does Ryan pay each month?

   Answer:

4. A car does 360 miles on 12 litres of petrol.
   How many miles does it do per gallon?

   Answer:

Division with A Remainder Left

Real life division questions can be tricky you won't always end up with a whole number.

But sometimes, you will need to give a whole number as an answer

Example

A factory makes 84 cars in one day. Each car transporter can carry 8 cars. How many transporters are needed to carry all the cars away?

Answer: 84 ÷ 8 = 10.5

You can't have 10.5 car transporters, so you need to give your answer as a whole number.

10.5 is between 10 and 11, but there are too many cars for 10 transporters, so they will need 11.

Exam Type Questions

1. 275 students are travelling to a University Open Day in coaches. Each holds 52 people. How many coaches are needed?

   Answer:

2. Thompson Aero Seating in Craigavon, make 124 airplane seats a month. They are transported in transporters that can hold 8 seats. How many transporters are needed?

   Answer:

Square Numbers

In the exam, you need to know how to work with formulas which may involve squaring numbers.

To square a number, multiply it by itself.

Example

What is 3 squared?

1	2	3
4	5	6
7	8	9

3 x 3 = 9

'Squared' is often written as a little 2, like this:

$4^2 = 16$

1. What is 3^2?

   Answer:

2. What is 9^2?

   Answer:

3. What is 17^2?

   Answer:

4. What is 24^2?

   Answer:

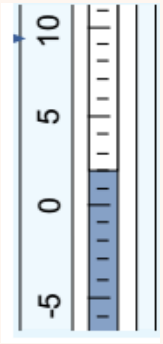
Negative Numbers (Temperature)

You may be asked in the exam to read a temperature scale that includes negative numbers

Example 1

This is part of a thermometer. It shows the temperature in degrees Celsius

What temperature is it?



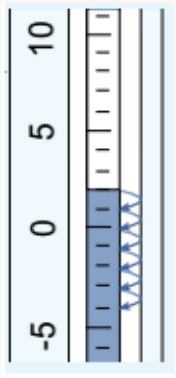
Answer: There are four lines between 0 and 5. So each line is worth one degree.

It is 2 degrees Celsius.

Example 2

This is part of a thermometer. It shows the temperature in degrees Celsius.

What would the thermometer read if the temperature dropped by 6 degrees?



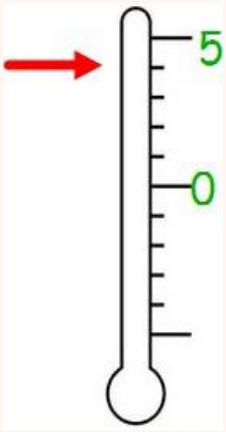
Answer:

1. Work out what the thermometer reads now.
2. Count down 6 places.

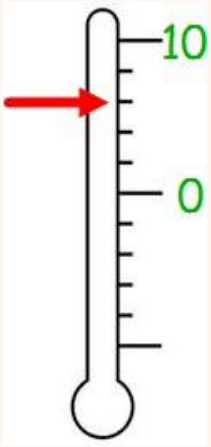
The thermometer would read -4 degrees.

Exam Type Questions

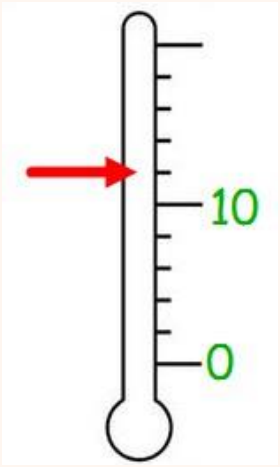
1. The temperature marked with an arrow falls by 7 degrees. What is the new temperature?



2. The temperature marked with an arrow falls by 8 degrees. What is the new temperature?



3. The temperature marked with an arrow needs to go down to 5 degrees. By how many degrees does it need to fall?



Finding Difference Between Positive and Negative Numbers

To find the difference between a positive and negative number, turn the negative into a positive and add them.

Example

What is the difference in temperature between Rome, 23°C, and Belfast, -4°C?

1. Turn the negative into a positive, so -4 becomes 4.
2. Then add them.
   23 + 4 = 27

The difference in temperature between Rome and Belfast is 27 degrees.

1. What is the difference in temperature between Barcelona which is 28° and Oslo which is -6°?

   Answer:

2. What is the difference in temperature between Belfast which is 5° and Moscow which is -12°?

   Answer:

3. Joe had -£125 in his bank account. He got paid and his bank account now reads £92. How much did he get paid?

   Answer:

Fractions of Amounts

Example

Work out $\frac{2}{5}$ of £40.

Answer: 40 is the whole amount.

£40				
£8	£8	£8	£8	£8

The denominator tells us how many pieces to split into: 40 ÷ 5 = 8

The numerator tells us how many of the small pieces to use: 2 x 8 = 16

Remember: Divide by the bottom, multiply by the top.

Exam Type Question

1. Jack raises £963.20 for charity. He spends $\frac{1}{4}$ of the money on raffle prizes. How much did he spend on prizes.

   Answer:

2. A second-hand car originally costing £15,000 is reduced by $\frac{2}{5}$ in a sale. How much is it being sold for?

   Answer:

Percentage of an amount

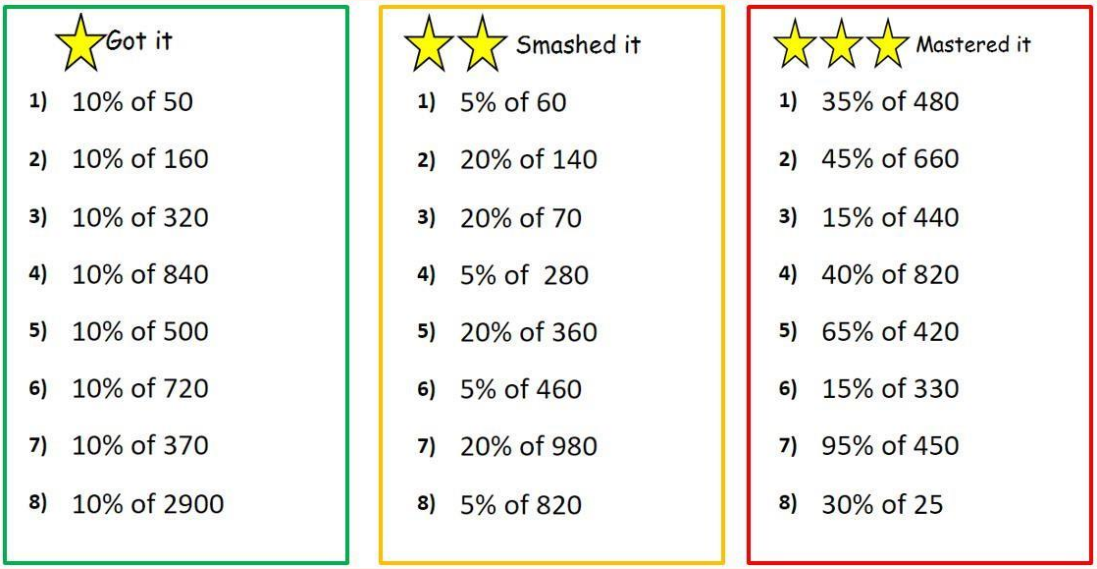
Example

What is 23% of £250?

Answer:

1. Find 1% by dividing the amount by 100.
   250 ÷ 100 = 2.5
2. Multiply the answer by 23 to get 23%.
   2.5 x 23 = 57.5

23% of £250 = 57.5



Exam Type Question

1. On a flight from Belfast to Amsterdam there are 250 passengers. 4% of the passengers are vegetarian. How many passengers are vegetarian?

   Answer:

2. A man bought a TV for £500. He had to pay a deposit of 15%. How much deposit did he pay?

   Answer:

3. Simon buys a car costing £12,000. He pays a 5% and agrees to pay the rest over 24 months. How much does he pay each month?

   Answer:

Percentage increase and decrease

Percentage increase

Find the value of the percentage and add it to the original amount.

Example

Repairs to Miss Jones's car cost £350 + VAT (20%). What is the cost including VAT?

Answer:

1. Calculate 20%
   350 ÷ 100 x 20 = 70
2. Add it to the original amount.
   250 + 70 =420

The total cost of repairs is £300.

Percentage decrease

Find the value of the percentage and subtract it from the original amount.

Example

A £60 dress has 30% off in a sale. What is the sale price of the dress?

Answer:

1. Calculate 30%
   60 ÷ 100 x 30 = 18
2. Subtract it from the original amount.
   60 – 18 = 42

The sale price is £42.

Find the following percentage increases or decrease of £420

10% increase

Answer:

5% decrease

Answer:

25% increase

Answer:

30% decrease

Answer:

8% increase

Answer:

12% decrease

Answer:

62% increase

Answer:

48% decrease:

Answer:

Percentage increase and decrease worded questions

1. A phone costs £129.99. Jack has to pay 17.5% VAT on top of the price of the phone. What is the new price of the phone?

2. Jack is always borrowing Jill's Kindle, so she bought a new one, which cost £109. She had to pay 17.5% VAT on it. How much did she pay?

3. Jill gets a 15% discount with a student card. She buys a pair of boots at £65. How much did she pay?

4. Jack buys a new pair of runners from Zara in sale event. He gets 30% off. How much did he pay if they cost £29?

5. Jack loses 35% of his Chitchat followers after a row with Jill. He had 450. How many has he left?

6. Jill had 20 people on her Wazapp thread. But after the row with Jack this went up by 80%. How many people are on the thread now?

Exam Type Question

1. Jack books a holiday costing £795. He pays a deposit of 35%. How much has he left to pay?

   Answer:
2. Jill books a spa weekend. It originally cost £250 but there was a 15% reduction. How much did she pay?

   Answer:
3. Georgia earns £24,000 per year and gets a pay rise of 2%. How much does Georgia earn per year after her pay rise?

   Answer:

Rounding

In your exam, you can sometimes get answers with lots of numbers after the decimal point.

Write down your whole answer but shorten it if asked or if it is money.

Follow the rule below.

Find your place and look next door.
4 or less, let it rest (stays the same).
5 or more, let it soar (add 1 more).
All digits in front, just stay the same.
All digits behind, zero's their name.

Example

Round £47.67 to the nearest tenth, or 10p.

Exam Type Question

1. Round £3.876 to the nearest tenth or 10p.

   Answer:

2. Jack gets an answer of £12.654. Write your answer to the nearest penny.

   Answer:

3. A chocolate bar contains 0.4175 grams of salt. Round this to 2 decimal places.

   Answer:

Equivalent Fractions, Decimals and Percentages

The following fractions, decimals and percentages all mean the same thing

It is good to know them for the exam. You will also be expected to turn fractions into decimal or percentages.

- $\frac{1}{2}$ is the same as 0.5, which is the same as 50%.
- $\frac{1}{4}$ is the same as 0.25, which is the same as 25%.
- $\frac{3}{4}$ is the same as 0.75, which is the same as 75%.
- $\frac{1}{10}$ is the same as 0.1, which is the same as 10%.

Fractions to decimals

Divide top of fraction by the bottom.

$\frac{3}{5}$ 3 ÷ 5 = 0.6

Fractions to percentages

Divide top of fraction by the bottom. Multiply answer by 100.

$\frac{3}{10}$ 3 ÷ 10 x 100 = 30%

Exam Type Questions

1. A sale is offering a 25% discount. What is this as a fraction?
   Answer:

2. What is $\frac{3}{5}$ as a decimal?
   Answer:

3. What is $\frac{3}{5}$ as a percentage?
   Answer:

4. Put the following in order from smallest to largest.
   0.25 50% $\frac{1}{10}$ 0.75 60%
   Answer:

5. Joe calculates the probability of winning a race is 3 out of 8. He needs to change this to a decimal so he can write it on a probability scale. What is 3 out of 8 as a decimal?
   Answer:

6. A gym carries out a customer satisfaction survey. It finds that 2 out of 10 customers are unhappy with the gyms service. What percentage is this?
   Answer:

7. A survey finds that 12 out of 20 students travel to college by bus. What is this as a percentage?
   Answer:

8. Sharon sits a Maths test and scores 38 out of 40. What is this as a percentage?
   Answer:

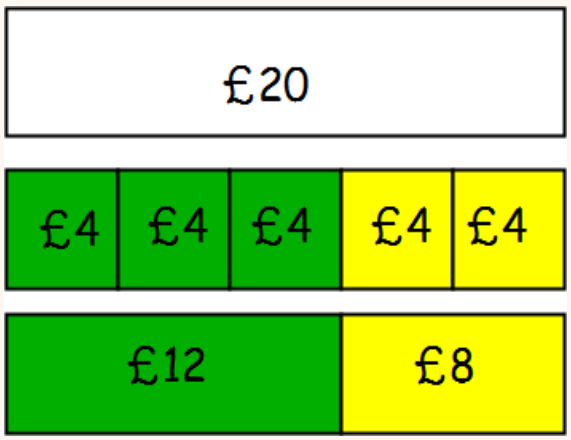
9. What is the probability of getting a 6 on a dice? Write your answer as a percentage.
   Answer:

Sharing Quantities in a Given Ratio

Sometimes you are asked to share a quantity (e.g. an amount of money) in a given ratio.

Example

Share £20 in the ratio 3:2.



If you don't want to use bars, then:

1. Add up the ratios or parts
2. Divide the amount by the number of parts
3. Multiply each ratio

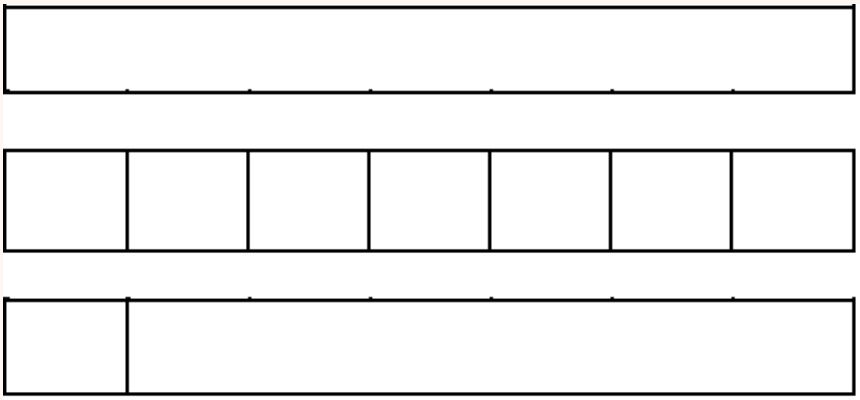
For example: Share £20 in ratio 2:3

2+ 3 = 5 part

£20 ÷ 5 = £4

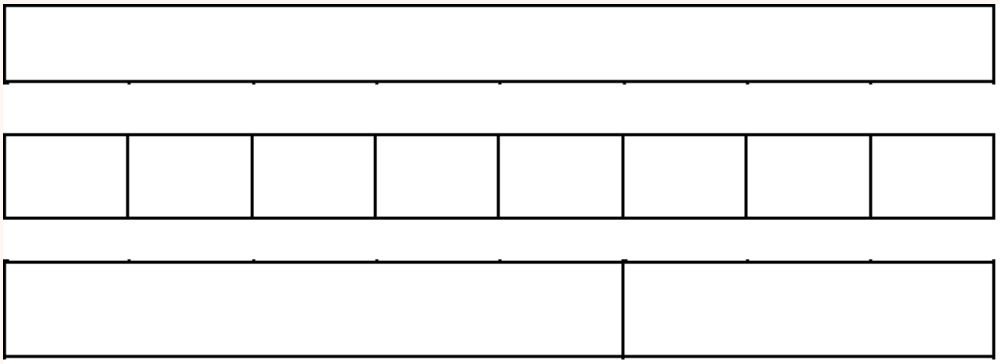
3 x 4 =12 and 2 x 4 = £8

1. Two people share £350 in the ratio 1:6. Calculate each share.



£ ..... £ .....

2. Divide £32 in the ratio 5:3



12

....

More difficult — draw your own bars this time if needed (Exam Style)

3. 600 tickets were sold for a concert.
   The ratio of tickets sold for a concert was 3 adults to 1 child (3:1) How many tickets were sold to adults and children

   Adults: Children:

4. At a Belfast Giants ice hockey game, the ratio of children to adults is 2:7. There are 2,700 people at the game. Each adult ticket is £12 and each child ticket costs £4 less than the adult ticket.
   Work out total amount made from ticket sales.

   Answer:

Scaling Recipes Up or Down

Example 1

Paula is making brownies. The recipe says to use 7 pieces of chocolate for every 2 eggs. Paula is using 10 eggs. How much chocolate will she need?

Answer: 10 eggs is five times as many eggs as in the recipe.

So, she will need five times as much chocolate.

7 x 5 = 35 pieces of chocolate.

Example 2

Jack is making spaghetti Bolognese. His recipe says to use 1 tin of tomatoes for every 500g of mince. The recipe serves 4 people. How much mince will Jack use for 20 people?

Answer: 20 is five times as many people as the recipe serves.

So, he needs to make five times as much Bolognese.

500 x 5 = 2500g of mince.

Example 3

Scones recipe (12 people)

- 240g flour
- 1 teaspoon salt
- 66g butter
- 6 teaspoons baking powder
- 1 egg
- 150ml milk

How much flour would you need to 4 people?

Answer: 4 is three times smaller than 12. So, you need to make three times less.

240 ÷ 3 = 80g

Exam Type Question

Ingredients

- 5 bananas
- 4 apples
- 2 oranges
- 12 grapes
- 24 blueberries
- 20 strawberries
- 100ml orange juice
- 8 kiwi fruit
- 50ml lemonade
- 10 raspberries

1. The fruit salad recipe above is for 8 people. How many strawberries would you need if you needed to scale up the recipe for 24 people?

   24/8 = 3

   so 20 x 3 = 60

2. The fruit salad recipe above is for 8 people. How much lemonade would you need for 4 people?

Carrot cake ingredients (12 people)

- 320ml vegetable oil
- 8 eggs
- 200g self-raising flour
- 420g caster sugar
- 1 teaspoon cinnamon
- 880g grated carrot

3. How many eggs would need if you had to make carrot cake for 36 people?

Scaling up (no direct proportion)

Sometimes there is no direct proportion clearly visible.

If this is the case follow the golden rule below:

Divide for one, then times for all.

Example 1

5 pints of milk cost £1.30. How much do 3 pints cost?

Answer: The golden rule tells you to divide the price by 5 to find out the cost for 1 pint, then multiply by 3 to find the price for 3 pints.

1 pint = £1.30 ÷ 5 = 0.26 or 26p

3 pints = 26p x 3 = 78p

Example 2

Joanne is handing out some leaflets. She gets paid per leaflet she hands out.

If she hands out 300 leaflets, she gets £2.40.

How many leaflets will she hand out to get £8.50?

Answer: Divide by £2.40 to find out how many leaflets she has to hand out to earn £1.

Multiply by £8.50 to find out how many leaflets she has to hand out to earn €8.50.

To earn £1: 300 + £2.40 = 125 leaflets

To earn £8.50: 125 x £8.50 = 1062.5

She will need to hand out 1063 leaflets.

Exam Type Questions

1. The cost of two identical T-shirts is £48. How much would 9 T-shirts cost?

   Answer:

2. Given that 3 carrots cost £39p, how much would 8 carrots cost?

   Answer:

3. Jack runs 10 km in 48 minutes. How long will it take him to run 18 kms at the same pace?

   Answer:

Formula

A formula is a set of instructions to help you work out an answer

You might be given a formula and asked to work out its value when you put in certain numbers. All you have to do is follow the method below

1. Write out the formula
2. Write it out again, directly underneath, but substituting numbers for letters on the RHS (right hand side)
3. Work it out in stages. Use BODMAS to work things out in the right order. Write down values for each bit as you go
4. DO NOT attempt to do it all in one go on your calculator- you are more likely to make mistakes.

Example 1

B – 7c – 3k. Find the value of B when c = 3 and k = 4.

Answer:

B = 7c – 3k	Write out the formula again.
B = 7 x 3 – 3 x 4	Write it again, substituting numbers for letters on the RHS.
B = 21 - 12	Use BODMAS to work things out in the right order. Multiply first, then subtract.

B = 9

Example 2

The formula for converting from Celsius (C) to Farenheit (F) = $\frac{9}{5}$ C +32

Use this formula to convert 15 degrees Celsius to Farenheit.

Answer:

F = $\frac{9}{5}$ C + 32 Write out the formula.

F = $\frac{9}{5}$ x 15 + 32 Write it out again, substituting numbers for letters on the RHS.

F = 27 + 32 Use BODMAS to work things out in the right order. Multiply first, then add.

F = 59, so 15 Celsius = 59 Farenheit

Exam Type Questions

1. Jack uses the formula below to work out how many fence posts he needs, where n = number of fence posts and p = number of panels:
   n = p + 1

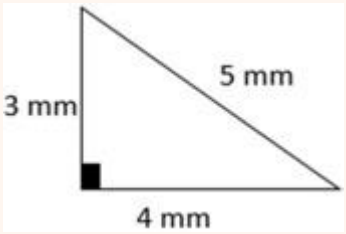
   Jack's front garden will have 8 panels. How many fence posts will he need?

   Answer:

2. To convert Celsius to Fahrenheit, you can use the formula F = 1.8C + 32
   Calculate Fahrenheit (F) when Celsius(C)= 8 degrees

   Answer:

3. The formula for finding the area of a triangle is ½ bh What is the area of the triangle below?



Answer:

4. The formula for the volume of a cylinder is $V = \pi r^2 \frac{h}{3}$

The radius of the cone is 3cm, the height is 8 cm, and take π to be 3. What is the volume of the cone?

Answer:

Reverse Calculations

Easy marks in the exam. You will be asked to check your work using a different method. Do so using a reverse calculation.

Example 1

A subtraction:

452 – 197 = 255

Can be checked, like this:

255 + 197 = 452

Check these subtractions by doing an inverse operation on them. Which are wrong?

a) 56 – 27 = 39
b) 53 – 29 = 34
c) 67 – 35 = 32
d) 123 – 45 = 72

Example 2

A division:

1288 ÷ 56 = 23

Can be checked with a multiplication:

56 x 23 = 1288

Check these divisions by doing the inverse operation on them. Which are wrong?

a) 208 ÷ 8 = 26
b) 3393 ÷ 39 = 77
c) 1736 ÷ 31 = 56

In the questions below write down the calculation needed to check the answer.

1. Jack has 200 cms of fabric and cuts 60 cms off. How much has he left?

2. Jacks buys 4 apples for £2.20. How much does one cost?

3. A pen costs £1.20. How much do 8 cost?

Calculations with Time

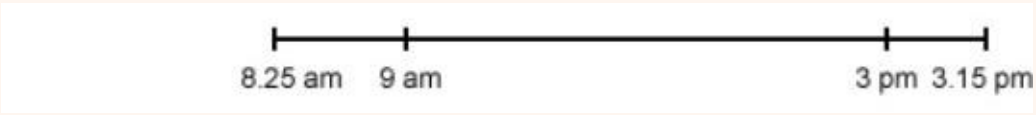
CALCULATION WITH TIME IDENTIFIED BY THE EXAMINERS AS BEING AN AREA WHERE LEARNERS LOST MARKS

Example

Michael starts college at 8:25 AM and finishes at 3:15 PM. How long was he at college?

Use a time line (like a number line).

Next, mark 9 AM and 3 PM on the line.



If you want to, mark in 12 noon.

Now, calculate the time interval for each section.

Add them up.

3 hrs + 3 hrs+ 15 mins + 25 mins = 6 hrs 50 mins

CALCULATION WITH TIME IDENTIFIED BY THE EXAMINERS AS BEING AN AREA WHERE LEARNERS LOST MARKS

Work out the difference in time for the questions below.

1. 12:00 – 14:25
2. 8) 12:12 – 16:42
3. 16:50 – 19:15
4. 17:59 – 18:11
5. 17:45 – 21:30
6. 01:17 – 19:10
7. 11:20 – 15:40
8. 09:41 – 16:02
9. 12:15 – 20:10
10. 10:26 – 14:09

Exam Type Question

1. London is 5 hrs ahead of New York. A flight from New York to London leaves at 08:40 New York time and takes $9\frac{1}{2}$ hrs. What will the time be in London when you arrive?

   Answer:

Converting Metric Measures

The metric units of length are:

- Millimetres (mm)
- Centimetres (cm)
- Metres (m)
- Kilometres (km)

	÷10		÷100		÷1000	
mm	→	cm	→	m	→	km
mm	←	cm	←	m	←	km
	x10		x100		x1000	

Miss Jones jumped 3,250 mm = 325 cm = 3.25 m.

Paula ran 12,000 m = 12 km.

The metric units of mass are grams (g) and kilograms (kg).

1000 g = 1 kg

	÷1000	
g	→	kg
g	←	kg
	x1000	

750 g = 0.75 kg

5,000 g = 5 kg

80,000 g = 80 kg

The metric units of capacity are millilitres (ml) and litres (l).

1000 ml = 1 l

÷1000

ml ➔ l

ml ← l

x1000

100 ml = 0.1 l

330 ml = 0.33 l

20,000 ml = 20 l

Got it

Change to metres

1) 200 cm
2) 350 cm
3) 90 cm
4) 55 cm
5) 1040 cm
6) 10 cm
7) 5 cm
8) 1.5 cm

Smashed it

Change to centimetres

1) 5 m
2) 4.5 m
3) 2.8 m
4) 1.44 m
5) 2.05 m
6) 0.82 m
7) 0.6 m
8) 0.05 m

Mastered it

Fill in the blanks

1) 50 cm =.....m
2) 0.3 m = ...cm
3) 3.2 m = ...cm
4) 0.04 m = ... cm
5) 20 cm = ...m
6) 3 cm = ... m
7) 0.05 m = ... cm
8) 6502 cm = ... m

Exam Type Questions

1. A wall is 4.5 metres wide. Filing cabinets which are 50 cms wide need to be fitted along the wall. How many can you fit along the wall?

2. A kitchen wall measures 4 metres wide. A fridge measuring 80 cms needs to go along the wall. Kitchen cabinets measuring 50 cm need to fit along it too.
   How many kitchen cabinets can you fit along the wall?

Exam Type Questions

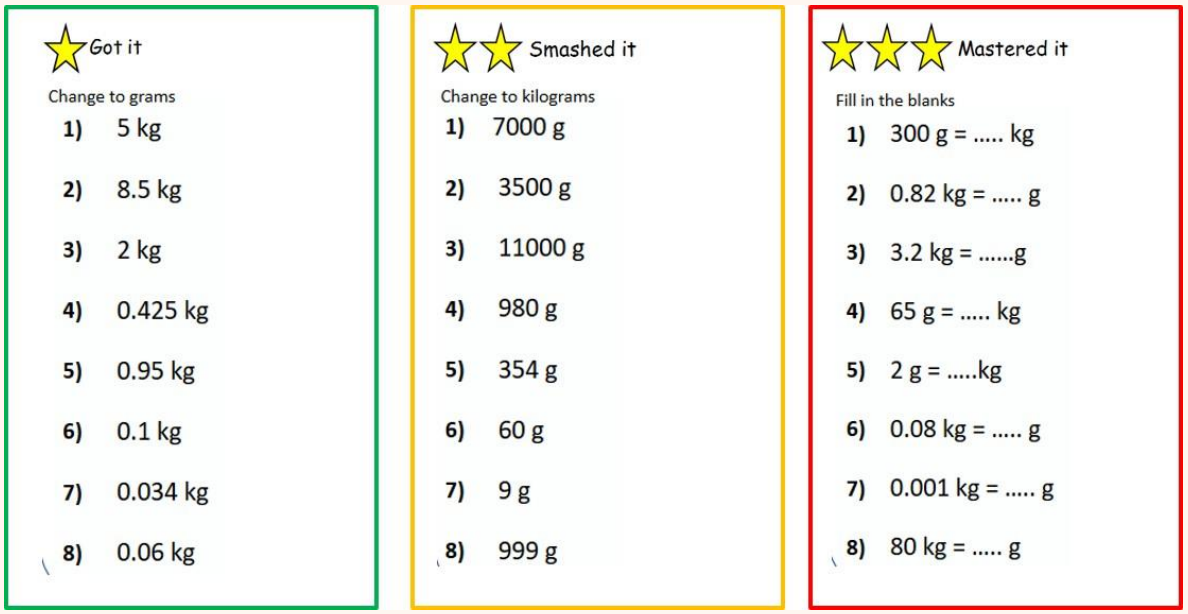
1. A floor is 5 metres wide. Tiles are 800 mm wide. How many tiles can you fit along the floor?

2. Cloth is sold in lengths of 1.5 metres. You need to cut into sections measuring 250 mm. How many sections can you cut from the cloth?

Exam Type Questions

1. Jack is running in a 5 km race. He has completed 2000 metres. How far has he left to run? Give your answer in metres

2. It takes Jack 3 minutes to run 500 metres. How long would it take him to run 2 kms?



Exam Type Question

Protein bar (makes 8 bars)	Smoothie (each)
1 tbsp sunflower oil	2 bananas
4 bananas	400 ml full fat milk 30 g oats
1tbsp honey 280 oats	150 g Greek yoghurt
3 tbsp mixed seeds	150 g mixed fruit

1. Ethan has 2kg of oats. He wants to make 4 smoothies and 40 Protein bars for an event. Does he have enough oats?

Exam Type Question

1. Ethan makes fizzy orange juice for the event as well. He mixes 1 part juice with 4 parts fizzy water to make his frizzy orange juice. How much fizzy water does he need if he wants to make 2 litres of fizzy orange juice?
   Tip: Use the bar model method from earlier

Converting Between Metric and Imperial

Sometimes you can't change from 1 unit to another by multiplying or dividing by 10, 100 or 1000.

You may have to multiply by a different number, the number you need (the conversion factor) will be in the question.

Common conversion factors

1 kg = 2.2 lbs

1 foot = 30 cm

1 gallon = 4.5 litres

1 litre = 1.75 pints

1 mile = 1.62 km

You don't need to know these for the exam, but you need to be able to use them.

Method

1. Find the conversion factor (always easy)
2. Multiply and divide by it
3. Choose the common sense answer

Example

The towns of Lisburn and Aghalee are 15 miles from each other. How far is this in km?

Answer:

1. Find the conversion factor
   1 mile = 1.6 km
   Conversion factor = 1.6
2. Multiply and divide by it
   15 x 1.6 = 24 km
   15 ÷ 1.6 = 9.375 km
3. Choose the sensible answer. 1 mile = 1.6 km, so there should be more km than miles.
   15 x 1.6 = 24 km

Exam Type Questions

1. 1 kg = 2.2 lbs. How many lbs are in 15 kg?

   Answer:

2. 1 km = 0.62 miles. Orla has travelled 20 kms. How far has she travelled in miles?

   Answer:

3. 1 litre = 35 fluid ounces (fl oz). Joe needs 8 fl oz of milk for a recipe. How many litres of milk does Joe need?

   Answer:

4. Given that 1 foot = 12 inches, convert the following to just inches, 27 feet and 8 inches?

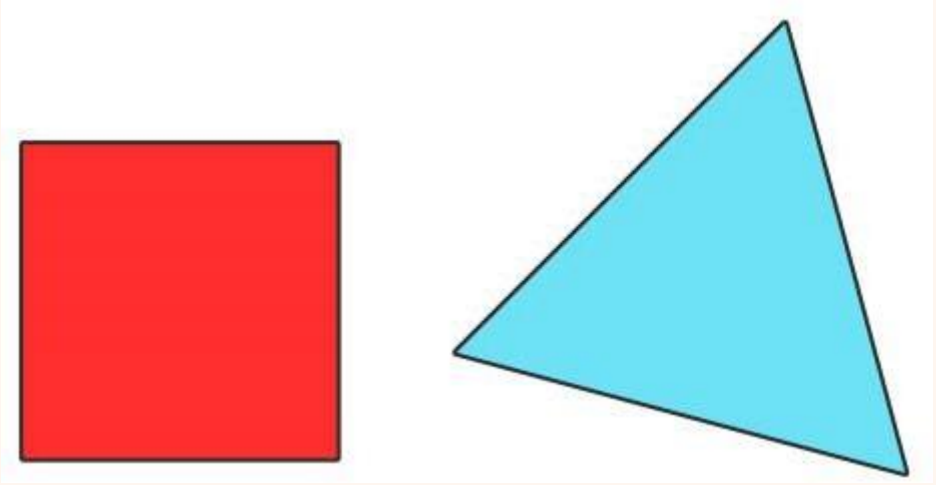
   Answer:

5. Jack needs to fit a climbing frame in a garden but his ruler has only cms on it and the assembly instructions are in feet and inches. He needs to change the measurements in the assembly pack into cms.
   Width of climbing frame: 12 feet and 6 inches
   Length of climbing frame: 15 feet and 4 inches
   1 foot = 12 inches 1 inch = 2.5 cms
   Use the conversion factors above to work out width and length of climbing frame in cms

   Answer:

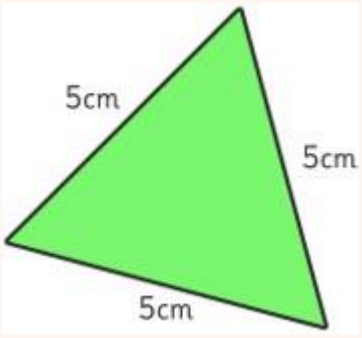
Area and Perimeter

The Perimeter is the total distance around the outside of a shape.

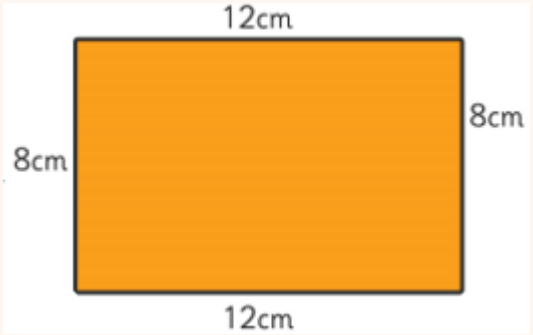


To find the Perimeter of any shape with straight sides simply add together all the sides.

The Perimeter of this triangle is 5 +5+5=15 cm

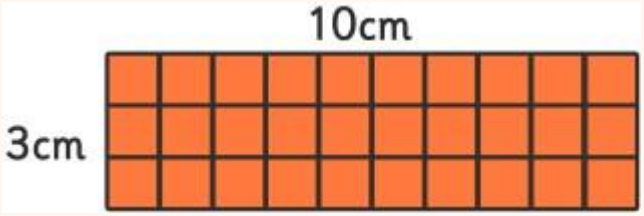


The Perimeter of this rectangle is 12 + 8 +12+8 = 40 cm

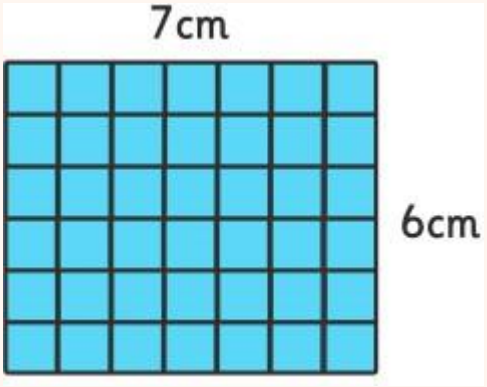


Area = length x width

The Area of this rectangle is 10 x 3 = 30 cm^2



The Area of this rectangle is 7 x 6 = 42 cm^2



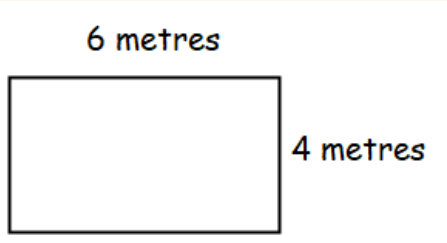
Don't expect the question to tell you to calculate area or perimeter you need to USE SOME COMMON SENSE.

A question about fencing will be a perimeter question, where as a question about painting a wall will be area.

Tip: make sure that you change any units in the question first.

Example

Questions about fitting tiles on floors are popular questions that involve area.



Stephen is laying tiles that are 40 cm wide and 40 cm long. How many tiles will he need?

1. Work out the area of the floor

   6 x 4 = 24 metres
2. Work out the area of the tiles in metres (change to metres first by dividing by 100)

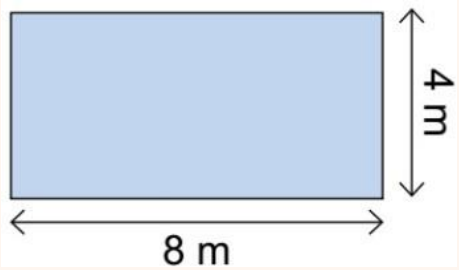
   Area of tile 0.4 x 0.4 = 0.16
3. Divide the area of the floor by area of the tiles

   24 ÷ 0.4 = 150

   150 tiles needed.

Area and Perimeter Practical problems

1. Simon is laying tiles in his conservatory that 25 cms wide and 40 cms long. How many tiles will he need? A plan of the kitchen is given below?



2. Joseph is laying carpet in his living room. His living room measures 8 metres by 5.5 metres.
   Draw a rough sketch of his living room below, including the measurements.
   Rough sketch:

   Roll of carpet: £40 for 5 metres
   Buy 5 rolls are more and get 20% discount on final price
   How much did Joseph pay for carpet to cover his room?
   Working out:

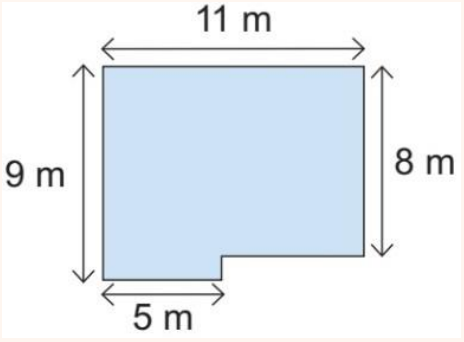
3. Joanne is painting her bedroom. One wall measures 12 feet high by 8 feet wide. Draw a rough sketch of her living room below, include the measurements?
   Rough sketch:

   Paint: 1 tin costs £15. 1 tin covers 30 feet^2.
   Buy 3 tins or more and get a 15% discount on final price.
   How much did Joanne pay to paint her room?
   Working out:

4. Jack is putting a fence around his garden. His garden is 65 feet wide by 40 feet long. Draw a rough sketch of the garden below, include measurements
   Rough sketch:

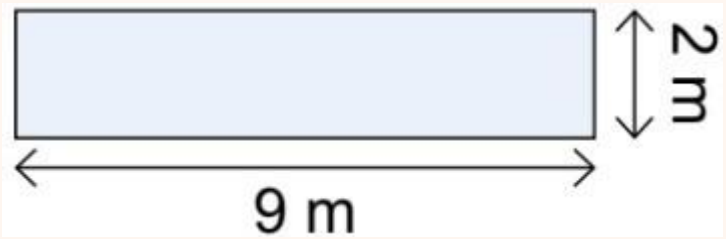
   Fencing: Fencing comes in packs of 20 feet Fencing costs £40 per pack.
   Buy at least 10 packs and get a 15% discount.
   How much did Jack pay for fencing?
   Working out:

5. Kevin is putting wooden panels around his garden. The panels are 50 cms wide and cost £15 for a pack of four. How much does Jack spend on panels to fence the garden which is shown below.



Working out:

6. Donna is also laying turf in his garden. The turf comes in squares that are 50 cms wide and 50 cms long. How many squares of turf will she need?



Working out:

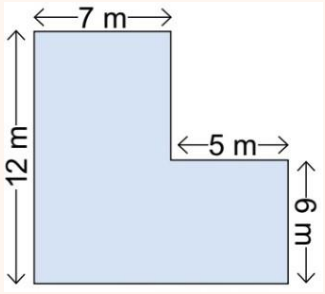
Areas of More Complicated Shapes

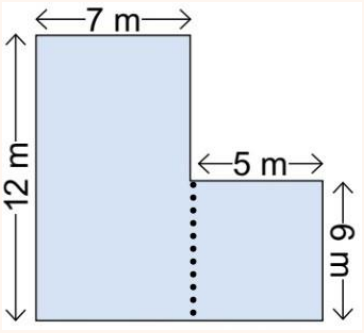
You often have to find the area of strange looking shapes in exam questions. What you always find with these types of questions is that you can break the shape up into simpler shapes that you can deal with.

1. SPLIT THEM UP into basic shapes, such as a rectangle and a square or two rectangles.
2. Work out the area of each SEPARATELY.
3. Then ADD THEM ALL TOGETHER.

Example

Find the area of shape below.





Split the shape into a large rectangle and a small rectangle as shown and work out the area of each shape.

Area of large rectangle = length x width

12 x 7 = 84 m^2

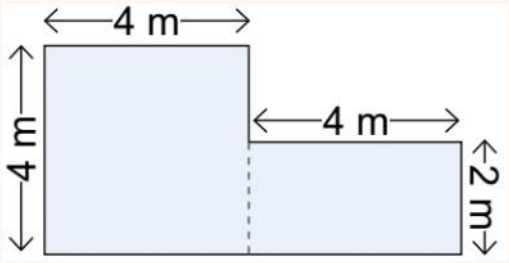
Area of small rectangle = length x width

5 x 6 = 30 m^2

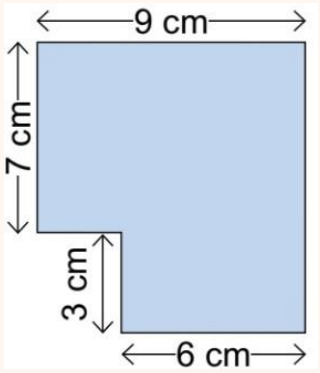
Add up both areas = 84 + 30 = 114 m^2

Exam type Questions

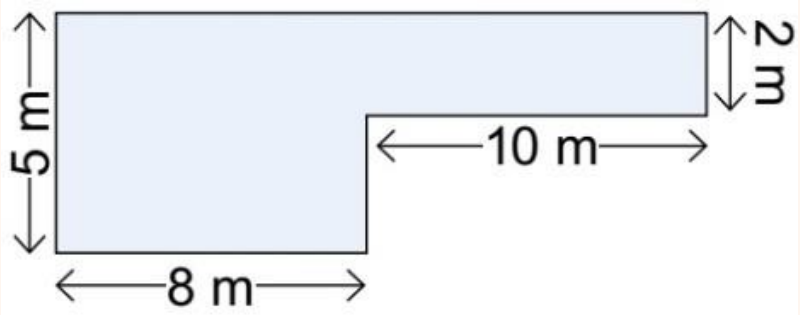
1. Find the area of the shape below?



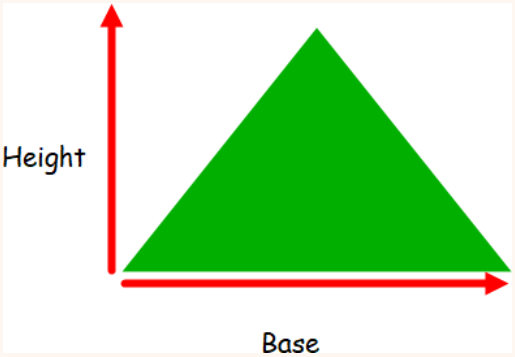
2. Find the area of the shape below?



3. Kerry is tiling the shape below with 50 cm long by 50 cm wide tiles. How many tiles does she need?



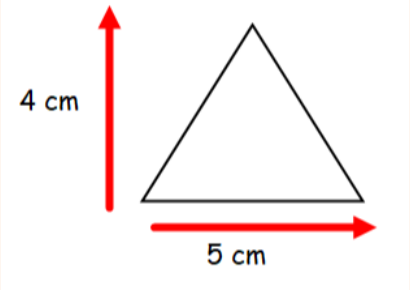
Area of Triangles



Area of triangle = $\frac{1}{2}$ x base x height

A = $\frac{1}{2}$ x b x h

Example



Put the base and the height into the formula.

Area of triangle = $\frac{1}{2}$ x base x height

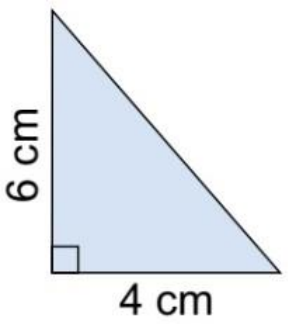
Area of triangle = $\frac{1}{2}$ x 5 x 4

Area of triangle = $\frac{1}{2}$ x 20

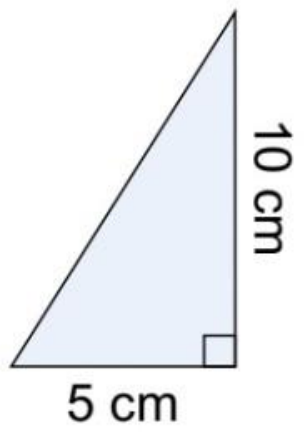
Area of triangle = 10 cm^2

Exam Type Questions

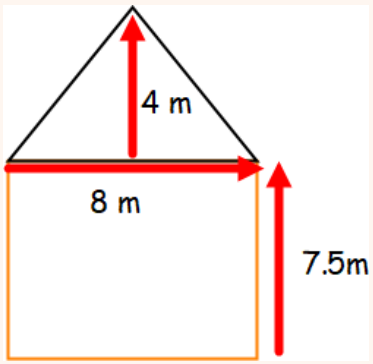
1. Find the area of the shape below.



2. Find the area of the shape below.



3. Paula is painting the side of the house shown. A tin of paint will cover 20m2. Paula needs to give the house 2 coats. How many tins of paint will she need?

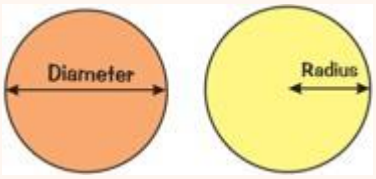


Circumference and Area of Circles

To answer circle questions you need to know the diameter and radius

The diameter goes right across the circle, passing through the centre.

The radius goes from the centre of the circle to any point on the edge.



The diameter is exactly double the radius.

Circumference and π

CIRCUMFERENCE is the distance round the outside of the circle (its perimeter).

Circumference = π x diameter

OR

Circumference = 2 π r

C = **π** x D

C = 2 x **π** x r

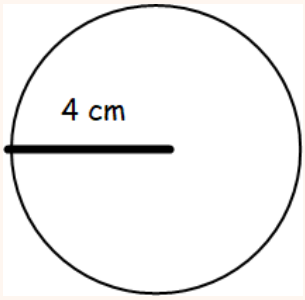
π =3.141592 = 3.142 approximately

The big thing to remember is that π (called pi) is just an ordinary number which is usually rounded off to 3.142. You can use the π button on your calculator or they might say to take π to be 3.

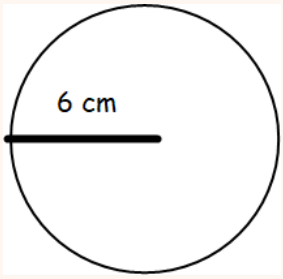
QUESTIONS ABOUT CIRCUMFERENCE WILL USUALLY INVOLVE PUTTING THINGS LIKE FENCING AROUND A CIRCLE SUCH AS A POND.

Exam Type Questions

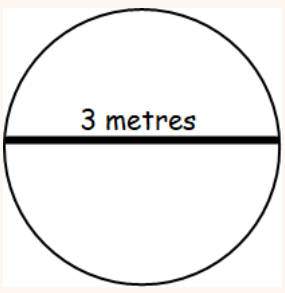
1. What is the circumference of the circle below?



2. What is the circumference of the circle below?



3. Paul needs to put a fence around a garden pond. The fencing comes in 50 cm long panels which can be cut. How many many panels will Paul need to go around the pond?



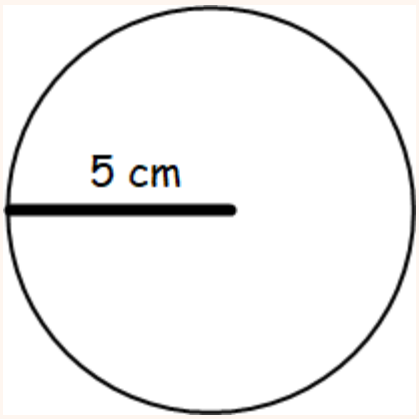
Area of Circles

To work out the area of a circle you need to know its radius. The you can use this important formula, which you don't have to learn as will be given in the exam.

Area of a circle = $A = \pi r^2$

Area of circle = π x (radius)^2

Example



Area of circle = π x r2

Area of circle = π x 5^2

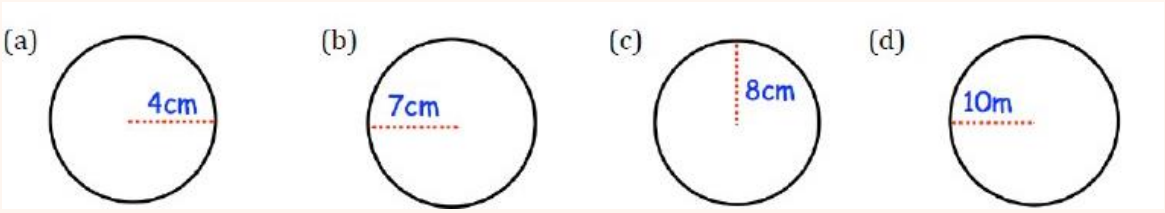
Area of circle = π x 25

Area of circle = 78.53

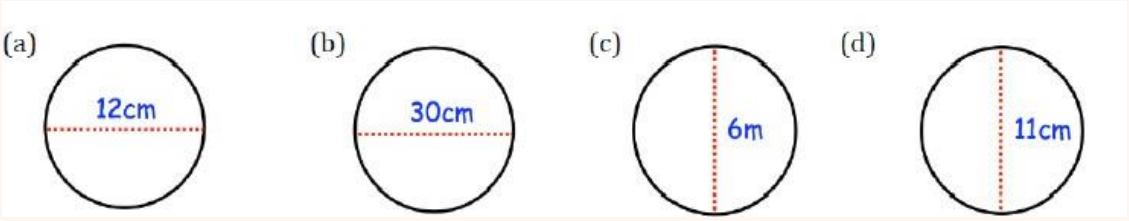
Area of circle questions may involve things such as working out the space that is needed for a pond in a garden.

Exam Type Questions

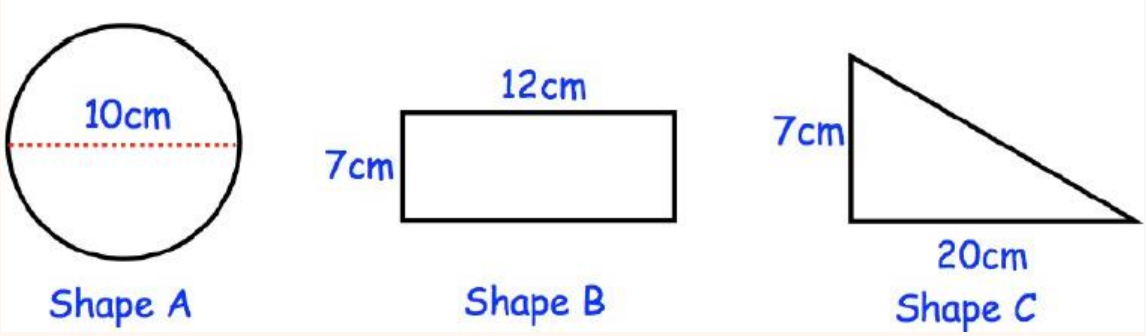
1. Calculate the area of the following circles. Give your answers to 1 decimal place.



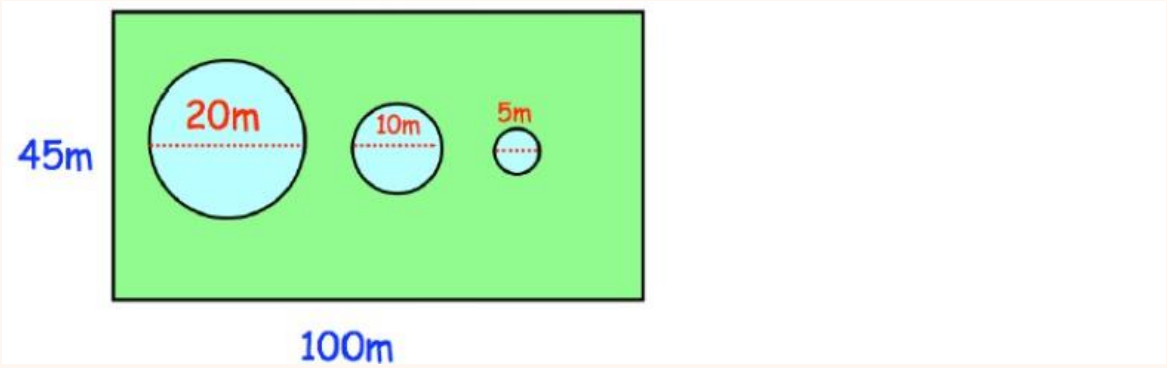
2. Calculate the area of the following circles. Give your answers to 1 decimal place.



3. Shown below is a circle, a rectangle, and a right-angled triangle. Which shape has the greatest area?



4. A lawn is 100 m long and 45 m wide with three ponds in it. Mr McCann wants to cover the lawn with grass seed. Each packet costs £1.49 and covers 50m^2. How much will it cost to cover the lawn?



Volume

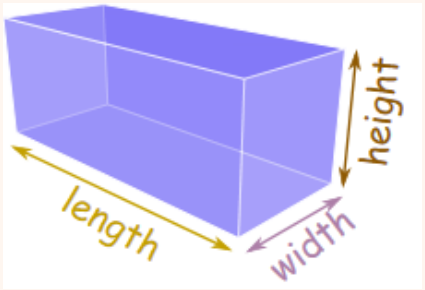
Volume is the amount of space a shape inside a 3d shape.

Volume is found using the formula:

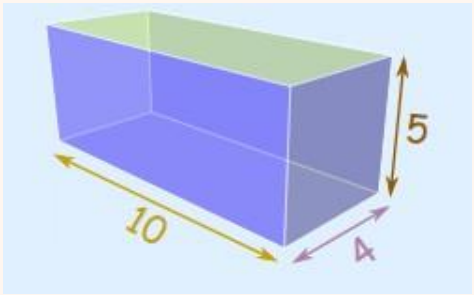
Volume = length x width x height

Which is normally shortened to:

V = L x w x H



In any order: It doesn't really matter which one is length, width, or height, as long as you times all three together.



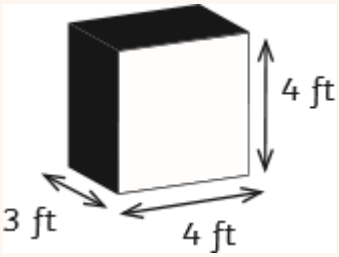
The volume is 4 x 5 x 10 = 200 m^3.

Exam Type Questions

1. Ben wants to fill a planter with soil. The planter is 60 cms wide, 80 long and 20cms high. What is the volume of soil that is needed to fill the planter?

2. Amelia has a container that is 10 cm long, 10 cm wide and 15cm high. I want to fill it with water. How much water do I need?

3. Joe is packing a box. The box is 4 ft long ,3 ft wide and 4 feet deep. What is the volume of the box?

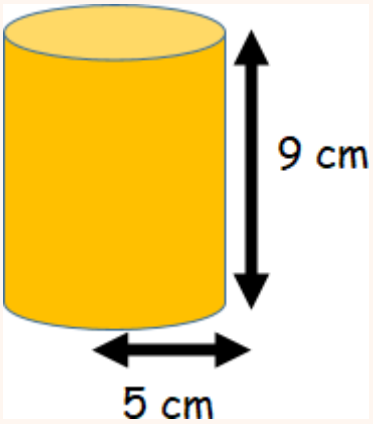


Volume of Cylinders

The volume of a cylinder = area of circle x the height.

This is given as the formula:

$$V = \pi r^2 h$$



1. Substitute numbers for the letters.
2. Follow the rules of BODMAS.
3. Make sure to include the right metric measures.

$V = \pi r^2 h$

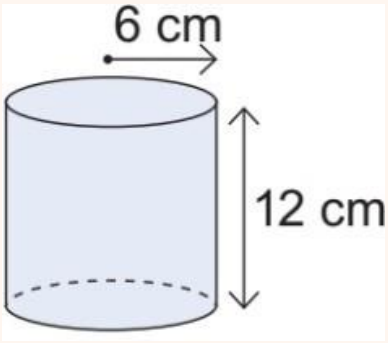
$V = \pi \times 5^2 \times 9$

$V = \pi \times 25 \times 9$

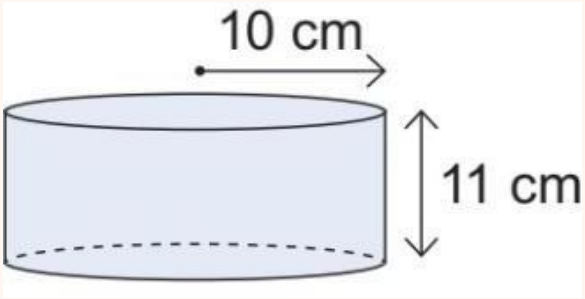
$V = 706.86\ cm^3$

Exam type Questions

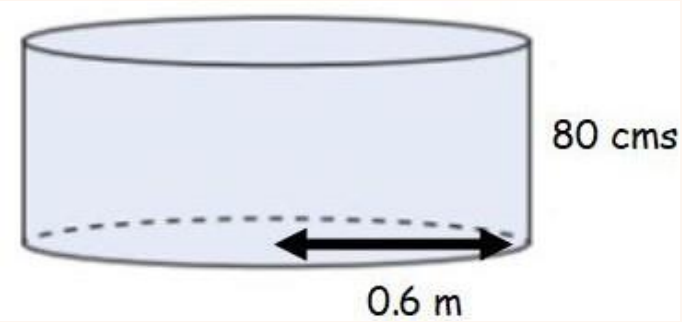
1. Calculate the volume of the cylinder below



2. Calculate the volume of the cylinder below



3. Kevin wants to fill the planter below with soil to its full height. The soil comes in 250 cm^3 Bags. How many bags will Kevin need to fill the planter?



Scale drawing

At Level 2 you will be expected to draw a scale plan using a given scale fit objects into your scale plan.

This may also involve changing metric measures SO LEARN THEM

MMS TO CMS ÷ 10

CMS TO METRES ÷ 100

METRES TO KMS ÷ 1000

Example

Jack has a wall which is 7 metres wide and 3 metres high. He wants to draw a plan of this wall. The scale he has been given is 1:50.

Work out the scaled measurements for the drawing.

Answer:

1cm =50 cms

This means that every 200 cms in the real world is worth 1 cm on the plan.

If you divide the actual measurements by 50 you will get what size they are on the plan. But change them from metres to cms first.

Actual Measurement	Calculation	Measurement on Plan
7 metres x 100 = 700 cms	700 ÷ 50	14 cms
3 metres x 100 = 300 cms	300 ÷ 50	6 cms

Scaled measurements for the drawing:

14 cm wide

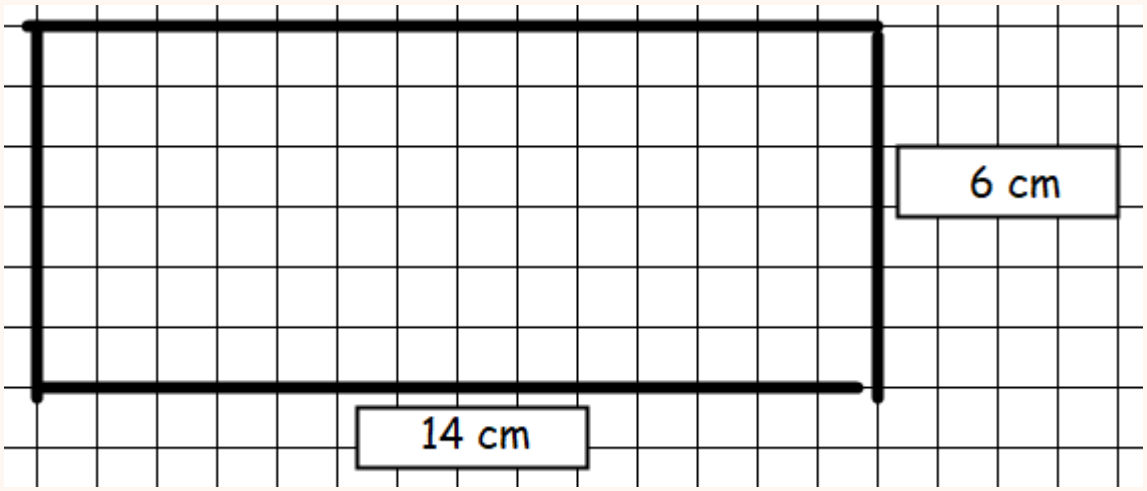
6 cm high

Draw the plan of the wall

To draw the plan, draw the measurements you worked out on the last question.

Make sure you include the scale that was given and label the plan.

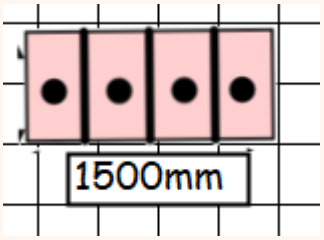
Scale 1:50



You have to place cabinets against the width of the wall. The cabinets are 1500 mm wide.

How many cabinets can you fit along the wall?

Working out:



You need to know the width of the wall and the width of the cabinets to work out how many fit in.

Width of wall = 7 metres width of cabinet = 1500 mm

Step 1

They are in different units, so we need to change them to something they have in common. I will go for cms

METRES TO CMS x 100

Wall 7m x 100 = 700 cms MMS to CMS ÷ 10

Cabinet = 1500 mm ÷ 10 = 150 cms

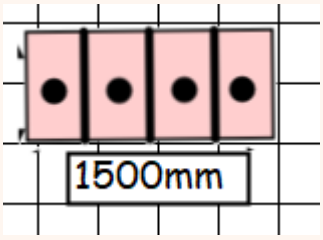
Step 2

Number of cabinets 700 ÷ 150 = 4.6

Step 4

4 cabinets as can't have 4.6 and 5 too many

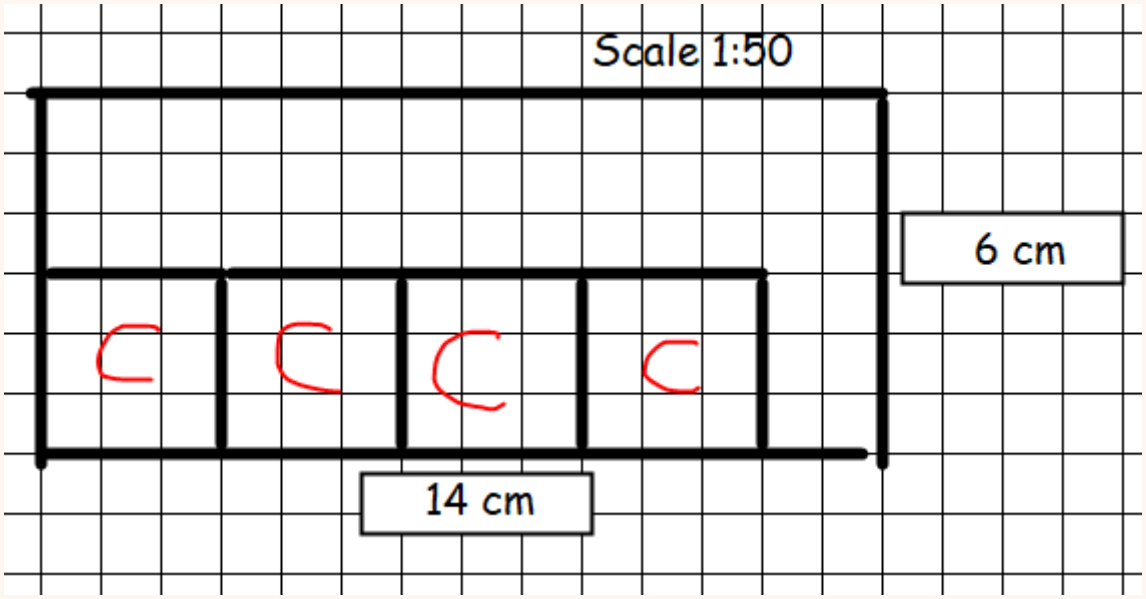
Draw the cabinets on your scale plan and label the plan.



Step 1.

Work out how many squares you need Each 50 cms on diagram is 1 cm on plan 150 ÷

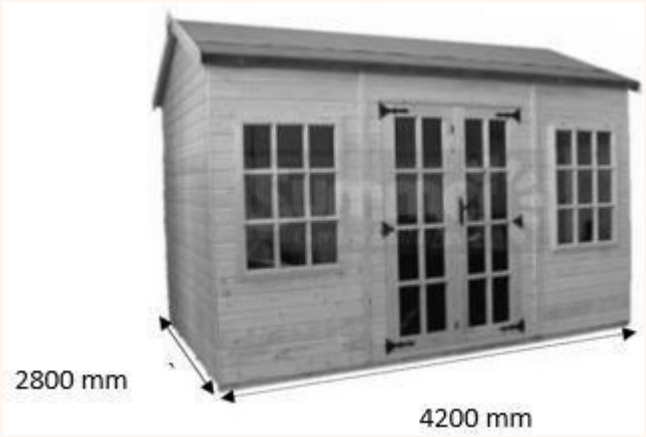
50 = 3 cms on plan per each cabinet



Exam Type Question

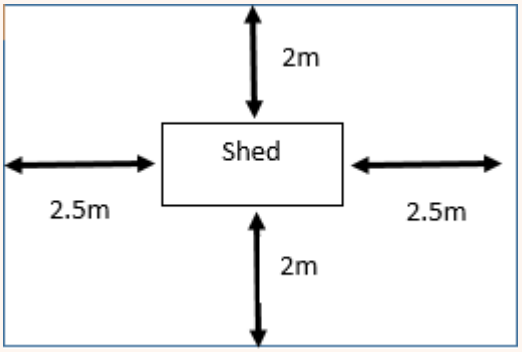
Question 1

This task is about planning a garden with a shed



Sketch plan to show position of shed on top of foundations.

Foundations:

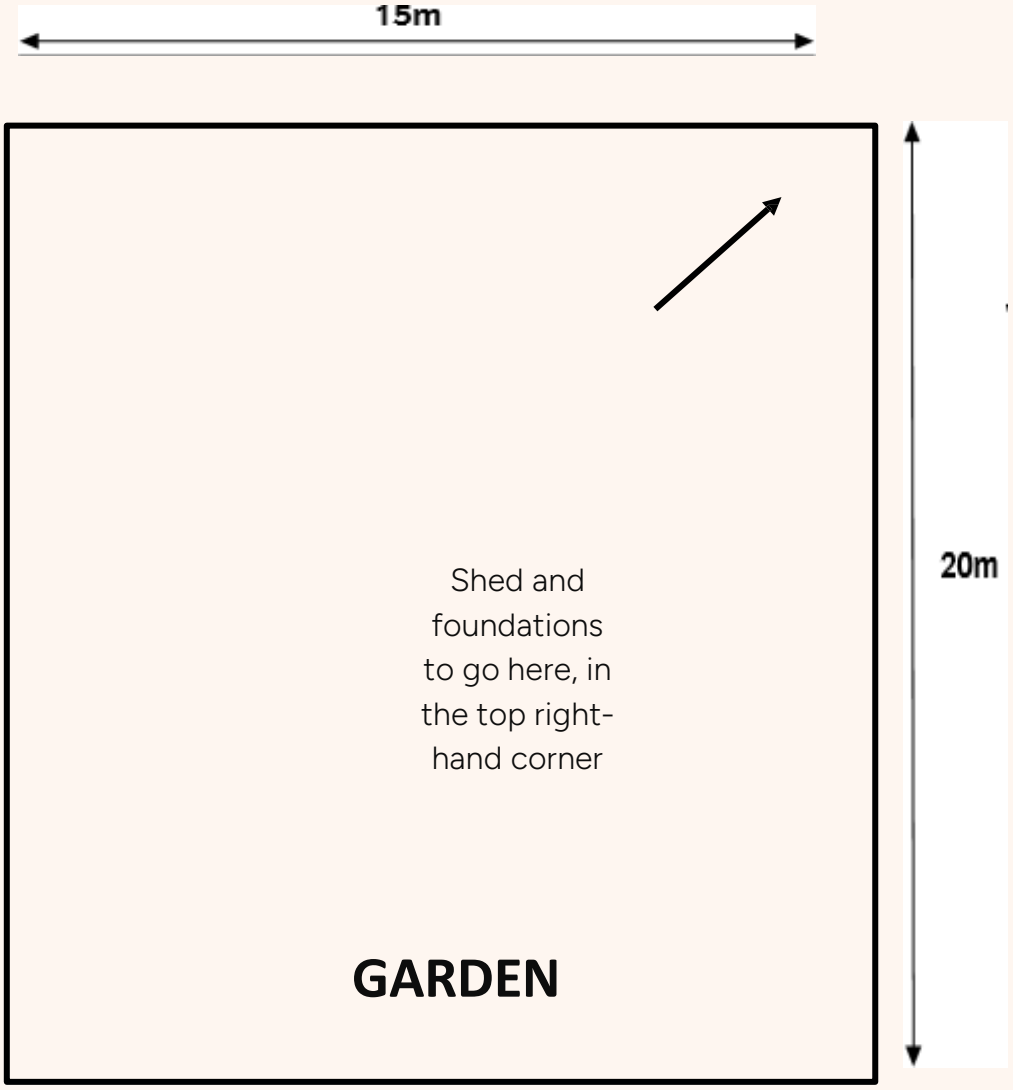


1A. What are the dimensions of the foundations? Show your working

Length:

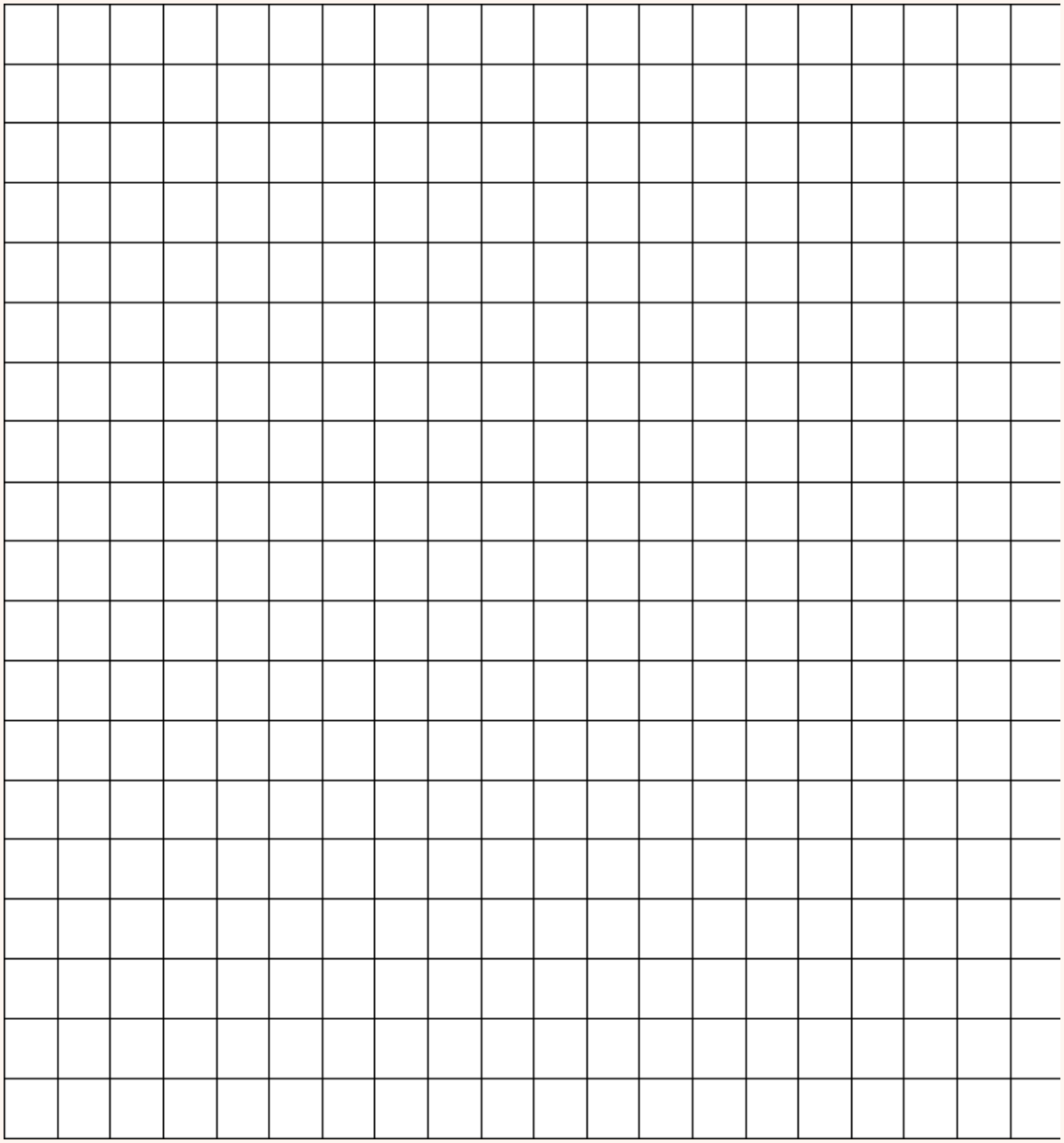
Width:

1B: The client wants the foundations and the shed to be in the right-hand corner of the garden. You have a sketch of the client's garden.



Draw a scale plan to show the outline of the client's garden. Add the foundations and shed to scale on your plan. Use a suitable scale. Label your diagram.

Use the graph paper on the next page.

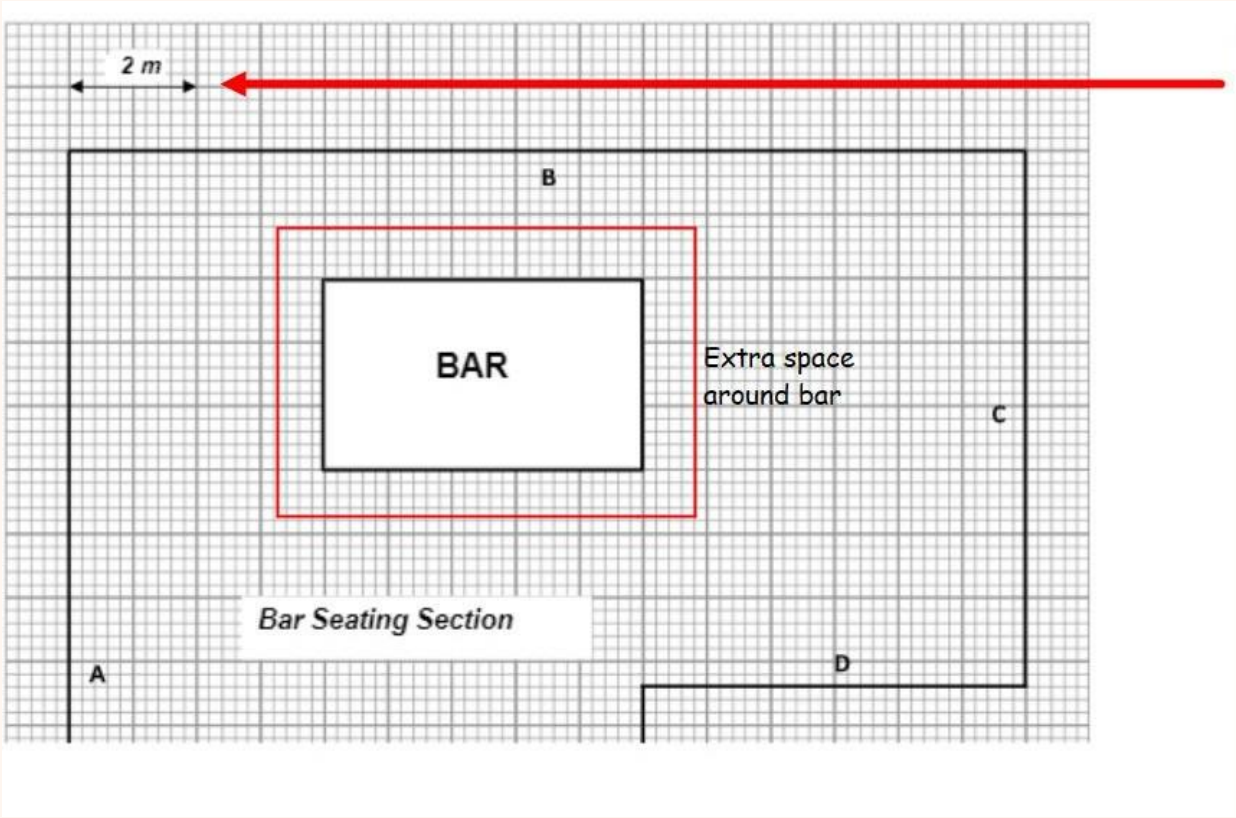


You need to show a check of how you used the scale in 1B.

Explain how you know one of the lines on your diagram is the correct scaled length. (2 marks)

Write your check here:

You might be given a scale that is represented in cm squares on graph paper.



What is the length of the bar?

Use the given scale

2cm squares = 2m, so 1 cm square must equal 1 m.

Bar is 5 cm squares long, so 5 x 1 m = 5 metres long.

You need to allow 80 cm of room around the bar. Draw a line to represent this.

Work out what 1 square is worth by dividing the measurements by the number of squares you have.

2 m ÷ 10 = 0.2 m

Or

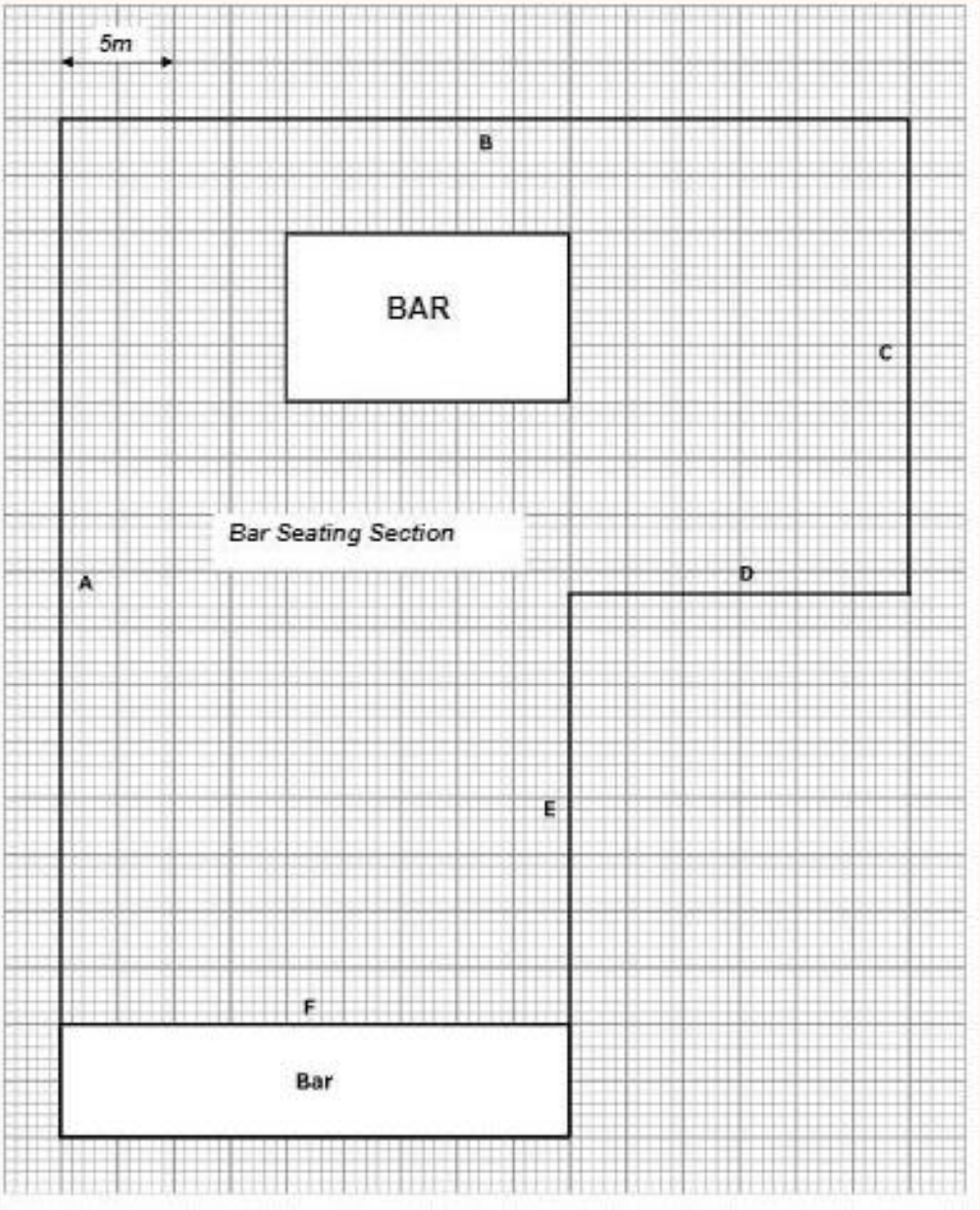
200 cm ÷ 10 = 20 cm

80 ÷ 20 = 4

You will need 4 small squares.

Your turn

Scale plan of the bar



Use the plan to work out the length of the sides for the restaurant seating area.

Space for working:

Side A length (metres):

Side B length (metres):

Side C length (metres):

Side D length (metres):

Side E length (metres):

Side F length (metres):

You want to put a gin bar against wall E. The gin bar's length is 8.5 metres and its width is 6m. It also has to be 10 metres away from the corner of the main bar. Draw the bar on the scale plan and label it.

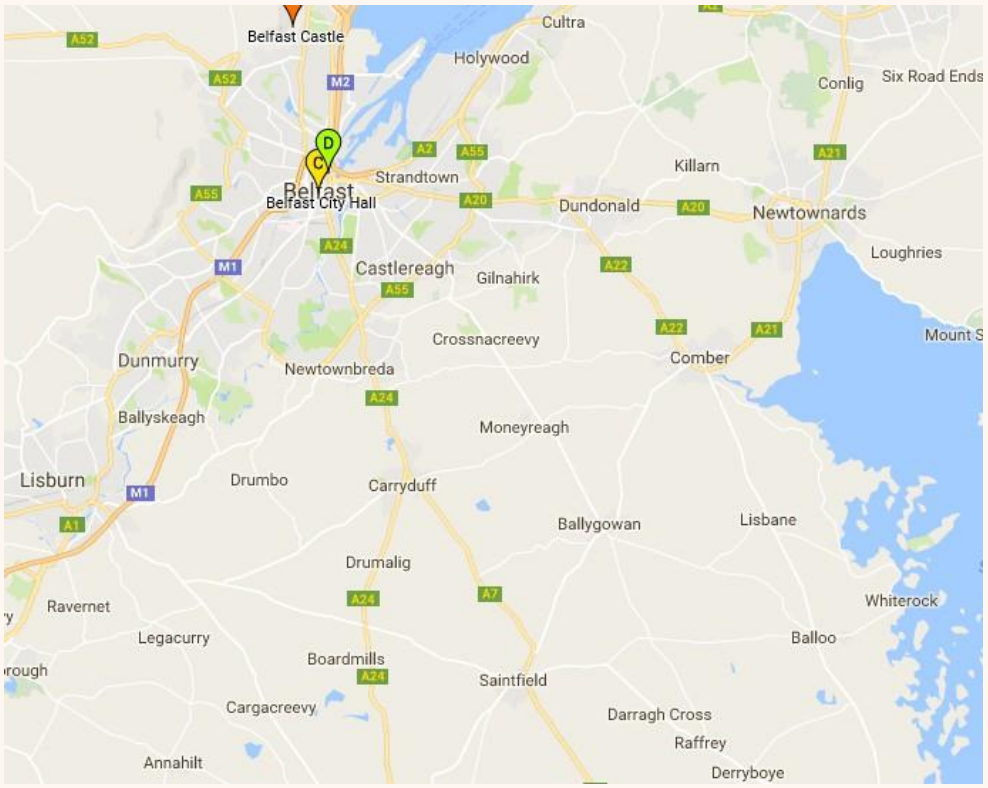
Show your working below:

Scale Maps

Scale tells us how 'zoomed out' a map is. It tells us what the distance on a map means in real life.

You may need to measure the scale using a ruler and then use it to figure out the distance.

Scale 1:200,000



Calculate the distance from Comber to Dundonald and give your answer in metres and kms.

Step 1

Find the scale on the map This gives 1 :200,000

Scale is always in cms, unless you are told otherwise

Step 2

Measure the distance on the map Comber to Dundonald is 6cm

Step 3

Multiply your measurement by the scale 6 cms x 200,000 cms = 1,200,000 cms

Step 4

Change to metres

To change CMS to METRES divide by 100 1,200,000 ÷ 100 = 12,000 m

Step 5

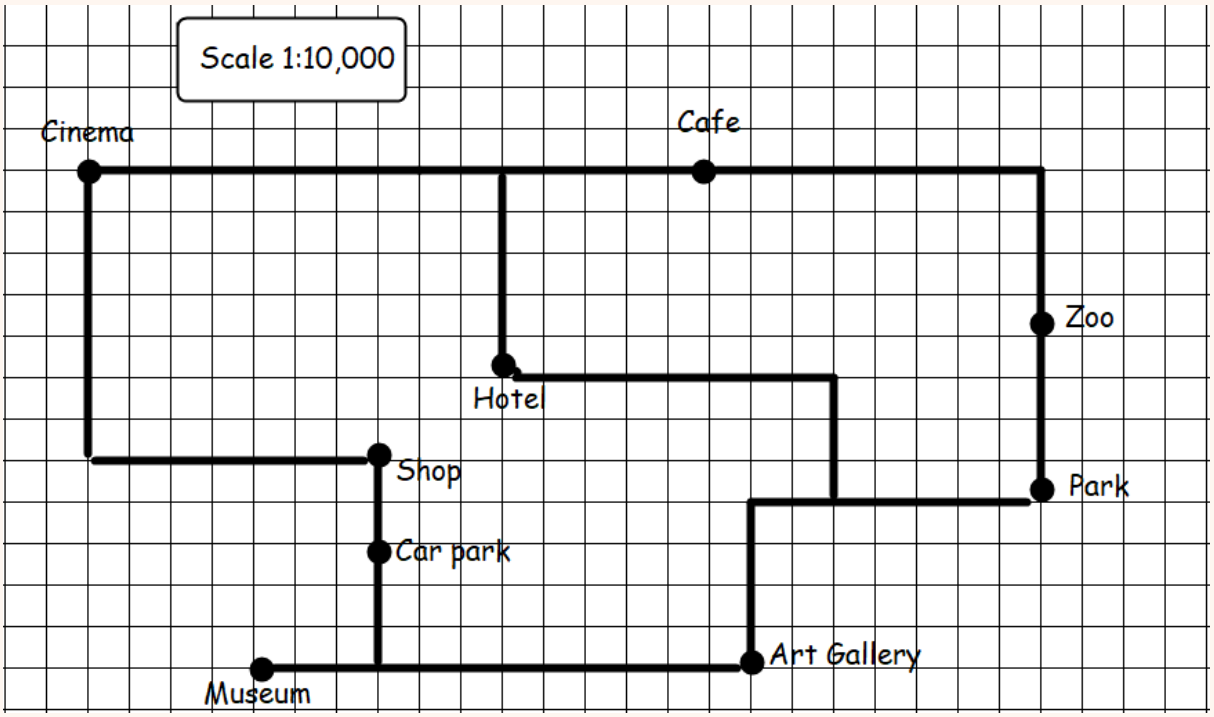
Change METRES to KMS by dividing by 1000 12,000 M ÷ 1000 = 12 kms

(not accurate to real distances)

Answers here will change based on printout size.

	Distance on the map	Actual distance in real life
Comber to Dunmurry		
Hollywood to Comber		
Comber to Anahilt		
Anahilt to Drumbo		
Drumbo to Conlig		
Conlig to Lisbane		
Lisbane to Cultra		
Cultra to Carryduff		
Carryduff to Whiterock		

Exam Type Question



1. Jack has organised a team bonding session with a short city break. You plan a route to visit the sites, starting and finishing at your hotel. You want to visit the Art Gallery, a park, the zoo and you want to go to a café for a meal.

   Plan your route, showing the order of places you want to visit. Work out the distances in metres and show in the table.

Order	Places to visit	Distance
Start	Hotel	—
First		m
Second		m
Third		m
Fourth		m
Fifth		m
Finish	Hotel	m
Total distance	—	km

Averages and range

The mean

Add up all your numbers and divide by how many there are

Remember if there are zeros in your numbers include them in the mean too.

Example

7, 5, 8, 5, 1, 7

7 + 5 + 8 + 5 + 1 + 7 = 33

33 ÷ 6 = 5.5

So the mean of the above numbers is 5.5

The median

Put all your numbers in order and find the middle value EXAMPLE

7, 5, 8, 4, 9

Put in order first

4, 5, 7, 8, 9

The median is 7 as it is the middle number.

The mode

The mode is the most common number example

7, 5, 8, 4, 5

The mode is 5 as it happens the most often

In the exam you will be asked to give a reason why you chose a certain average. Try to remember the pros and cons below for using each average

Average	Pros	Cons
Mean	Includes every value in the calculation	Affected by 'extreme' values
Median	Isn't affected by 'extreme' values	Doesn't include all the data
Mode	Isn't affected by extreme values Only average that can be used with words	No use if all the data is different

Range

RANGE is the difference between the lowest and highest values.

Remember if there are zeros in your numbers include them in the range too.

7, 5, 8, 5, 1, 7

Range: 8 – 1 = 7

Writing a comment about the range

Remember: a higher range is less consistent/less reliable.

Remember: a lower range is more consistent/more reliable.

Example Exam Questions

1. One member of a gym keeps a record of the time he spends running each day in one week.

Mon	Tues	Wed	Thurs	Fri
20	30	30	40	30

Choose an average to show the amount of time he spends running each day to the nearest minute.

Answer: 20 + 30 + 30 + 40 + 30 = 150

150÷5 =30 mins

Explain why you chose your average.

Answer: I chose the mean as it includes all the data (times) and there are no extreme values so the result will not be affected.

2. The table shows learners' scores out of 20 in a weekly Maths test.

Jack	Score	Ciara	Score
Week 1	12	Week 1	16
Week 2	15	Week 2	14
Week 3	9	Week 3	15
Week 4	0	Week 4	18
Week 5	19	Week 5	17
Week 6	13	Week 6	13
Week 7	12	Week 7	15

What is the range of Jack's tests scores?

Answer: 19 – 0 = 19 (0 always counts)

What is the range of Ciara's tests scores?

Answer: 18 – 13 = 5

Write two comments about Jack and Ciara's range.

Answer: Jack is very inconsistent as his range was high Ciara was consistent as her range was low.

Remember: A lower range is more consistent/more reliable.

Exam Type Question

You asked testers to give a score to 4 mobile phones for three features

1. Ease of Use
2. Battery Life
3. Camera quality

The table below shows the scores for ease of use

Phone	Number of Testers	Scores for Ease of Use
Apple iphone X	15	5 7 4 8 5 7 6 5 7 8 6 4 10 10 7
Samsung Galaxy 9	12	8 9 9 7 7 9 6 8 7 8 8 10
Moto G6	10	6 8 6 5 7 5 6 4 8 7
Pixl 2	12	5 7 2 7 3 6 5 5 8 5 2 5

Choose an average from mean, median or mode to show the mobile phones 'ease of use'. Show your working out.

Mean:

Median:

Didn't choose mode as there are several of them for the data, which means you can't use it to compare.

Phone	Average for ease of use
Apple iphone X	
Samsung Galaxy 9	
Moto G6	
Pixl 2	

Write a comment explaining why you chose the average you chose.

Answer:

Calculate the range of scores for ‘ease of use’ for each phone.

Phone	Range
Apple iphone X	
Samsung Galaxy 9	
Moto G6	
Pixl 2	

Write one comment about what the range shows.

Answer:

Probability

You will be expected to describe probability as a fraction, percentage or in words.

Probability is used to describe the chance of an event happening and is written like a fraction.

In general:

$$\text{Probability of an event happening} = \frac{\text{Number of Ways it can happen}}{\text{Total Number of Outcomes}}$$

Example

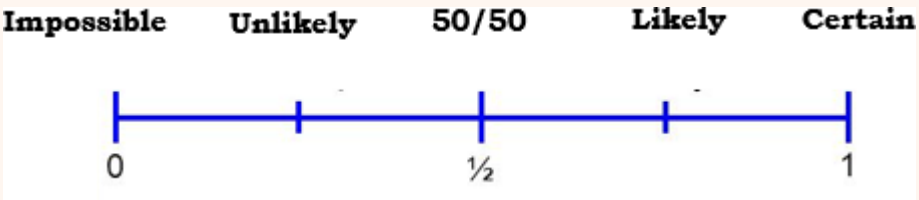
There are 5 marbles in a bag: 4 are blue, and 1 is red. What is the probability that a blue marble gets picked?

Number of ways it can happen: 4 (There are 4 blues.)

Total Number of outcomes: 5 (There are 5 marbles in total.)

So the probability = $\frac{4}{5}$

We can also show probability on a probability scale and use words such as likely, unlikely, 50/50, likely, and certain.

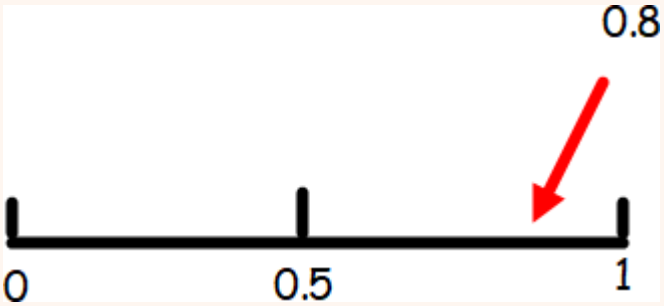


At Level 2, you will be expected to draw your own probability scale and put your answer on it. Make sure you label your scale.

To do this you would need to change $\frac{4}{5}$ into a decimal by dividing the top of the fraction by the bottom.

4 ÷ 5 = 0.8

You would be this close to 1 on your probability scale.



Exam Type Question

A shop stocks all four types of mobile phone

Phone	Cost	Battery Life
Apple iphone X	£850	10 hrs
Samsung Galaxy 9	£800	9.5 hrs
Moto G6	£650	12 hrs
Pixl 2	£680	14 hrs

A customer wants a phone that is under £700 and has 10 hrs or more of battery life.

What is the probability the customer will find a phone she wants in the shop? Show your answer on a number scale.

Tree Diagrams

When answering the probability question you may be asked to show your result on a probability scale or using a Tree Diagram.

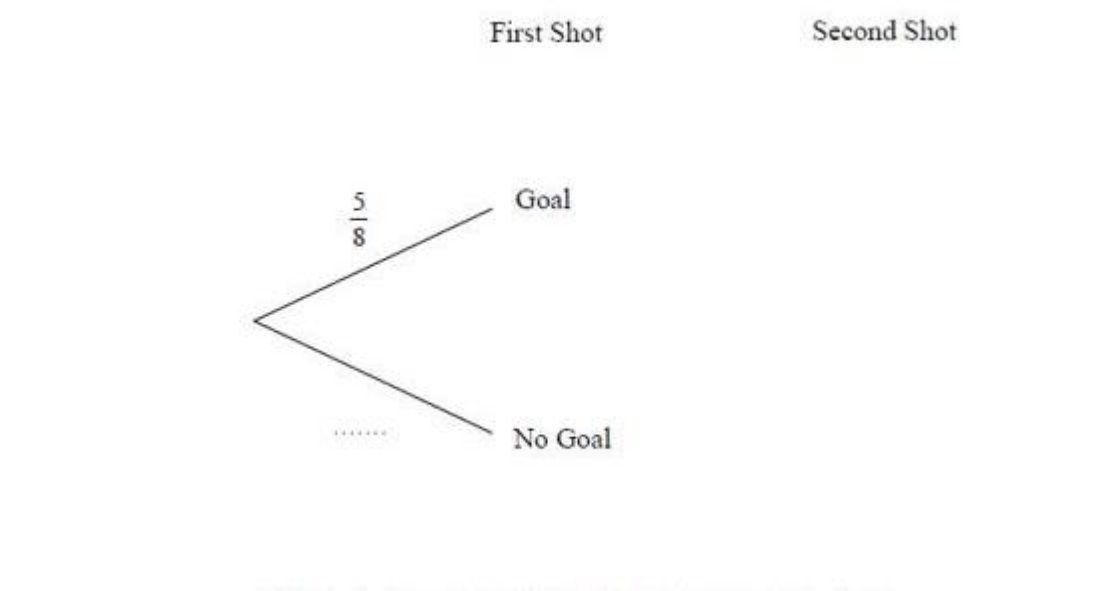
Example

Jack's team will play two games against their local rivals. Jack's team has a 7 out of 10 chance of winning the first game and a 25% chance of winning the 2nd. What is the probability they will win both? Show your answer using a tree diagram.

Things to remember

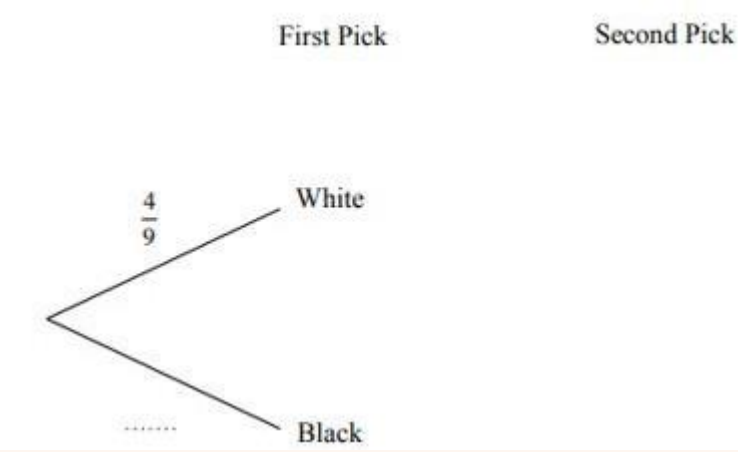
1. You will always have two options, in this case win, lose.
2. Make sure all branches are either fractions or decimals, not both. I change 25% to a ¼.
3. Multiply along the branches to get the end probability.
4. Label your tree diagram.

1. Each time Joe takes a shot at goal, the probability he scores is $\frac{5}{8}$. Joe takes two shots.
   Complete the probability tree below



   What is the probability that Joe scores twice?
   Answer:

2. A bag contains 4 white beads and 5 black beads. Joanne picks a bead at random and replaces it.
   The beads are mixed and she then picks at random another bead from the bag.
   Complete the probability tree of the problem



3. 500 people take their driving theory test in Larne. 50% of them pass the theory test first time. Out of those who pass the theory test first time, $\frac{4}{10}$ of them go on to pass the practical test first time.
   Work out the probability of passing both the theory and practical test first time.
   Draw a tree diagram to show your answer.
   Draw your tree diagram here:

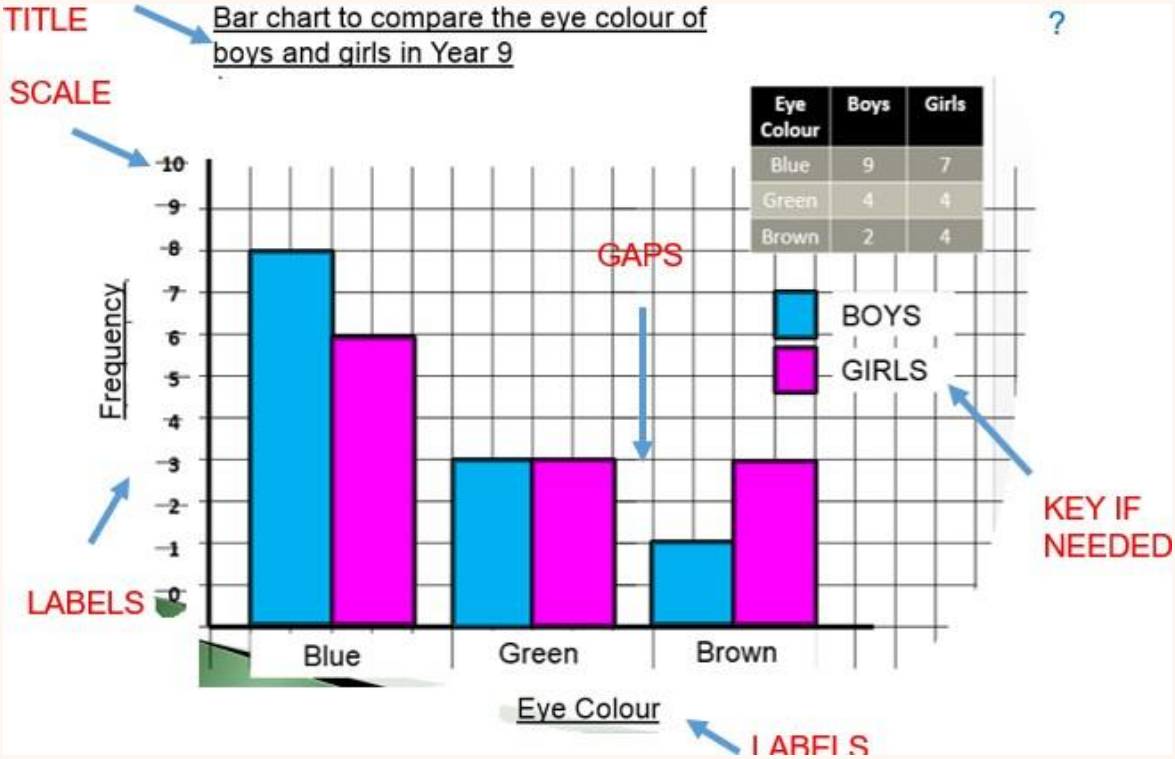
   Probability:

Bar charts

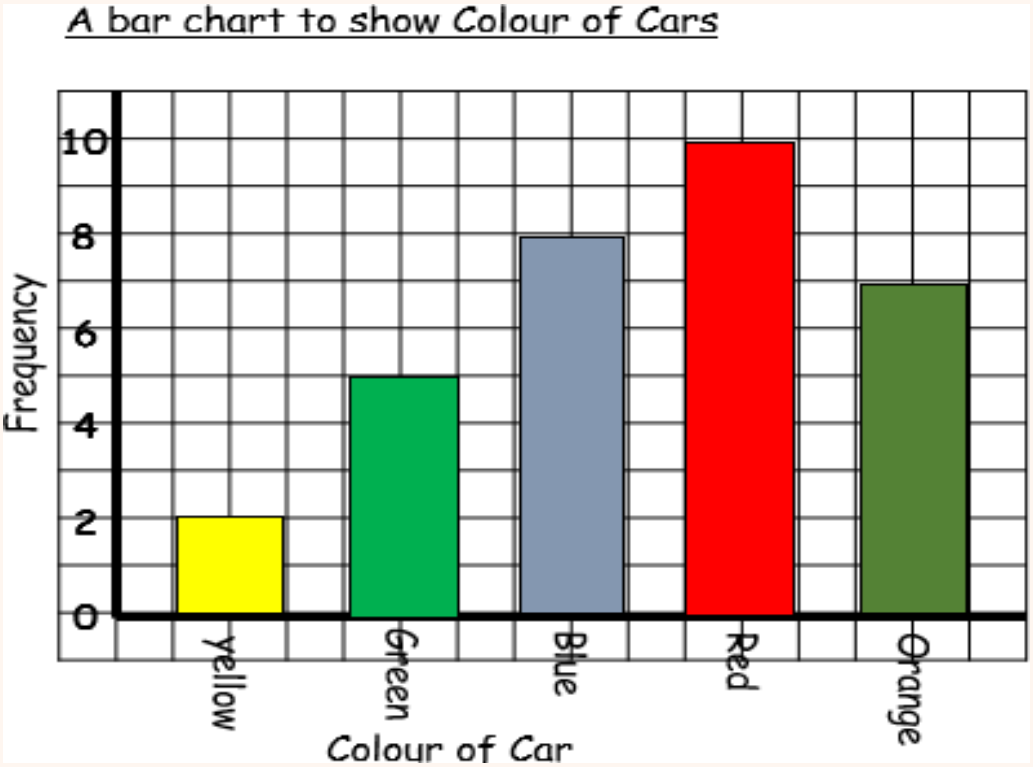
You will be expected to draw a bar chart in the exam. An example of a good bar chart is show below.

Learners lose marks by not including

- A Title
- Labels
- A key if needed
- Not starting their scale at 0



The bar chart below shows the colour of cars:



You will be expected to write a comment about your bar chart explaining what it shows.

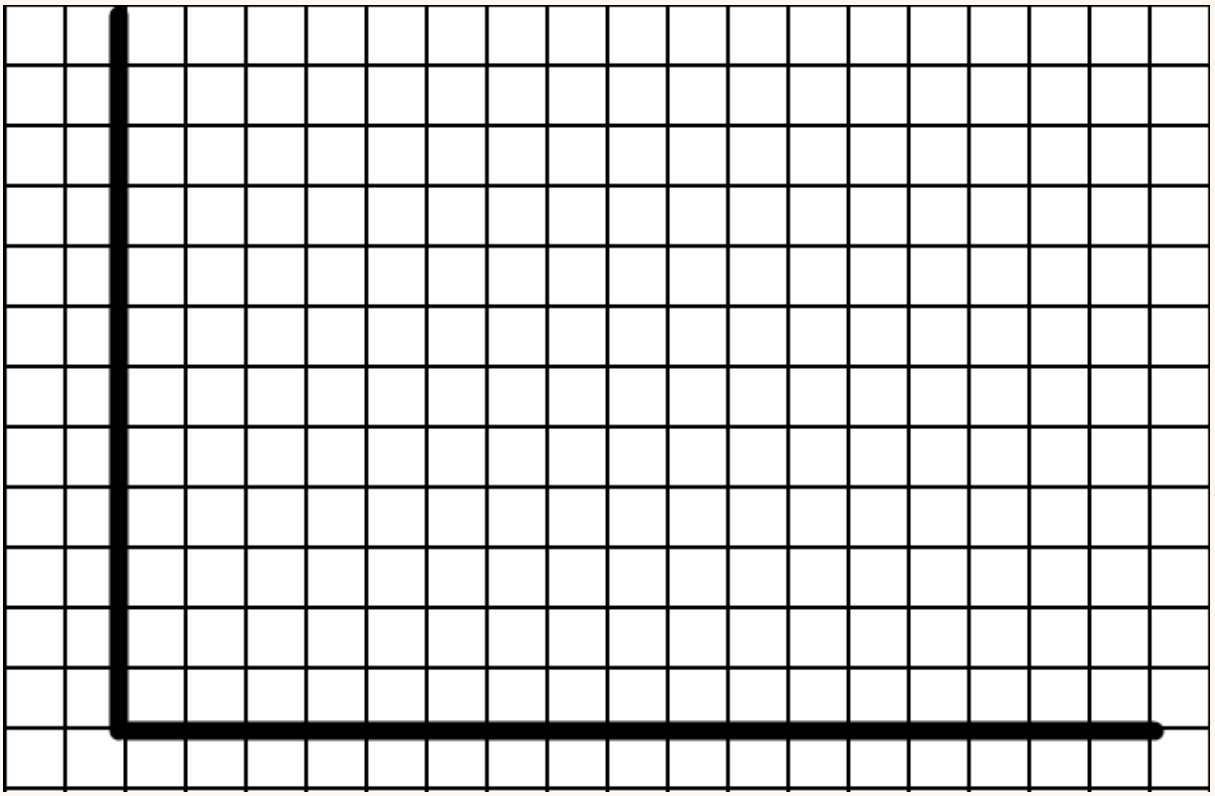
You need to compare. For example, I can see that there were more red cars sold than yellow.

Exam Type Questions

1. The table below shows the favourite takeaway food of a group of students. Draw the data in a suitable chart. Make sure to label your chart.

Type	Number
Indian	5
Chinese	20
Pizza	15
Fish and chips	25

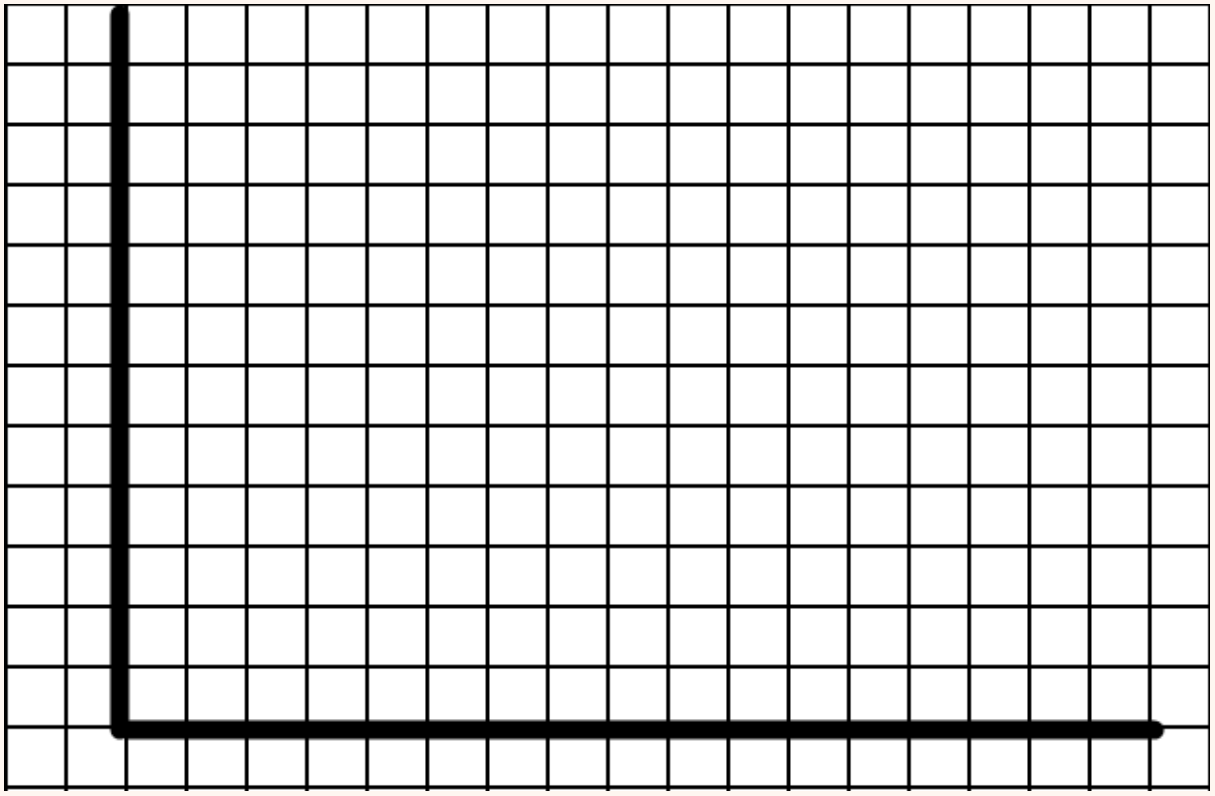
d)



a) Write a comment explaining what your bar chart shows.

2. The table below shows how many people ordered tea or coffee with their breakfast over three days. Draw the data in a suitable chart. Make sure to label the chart.

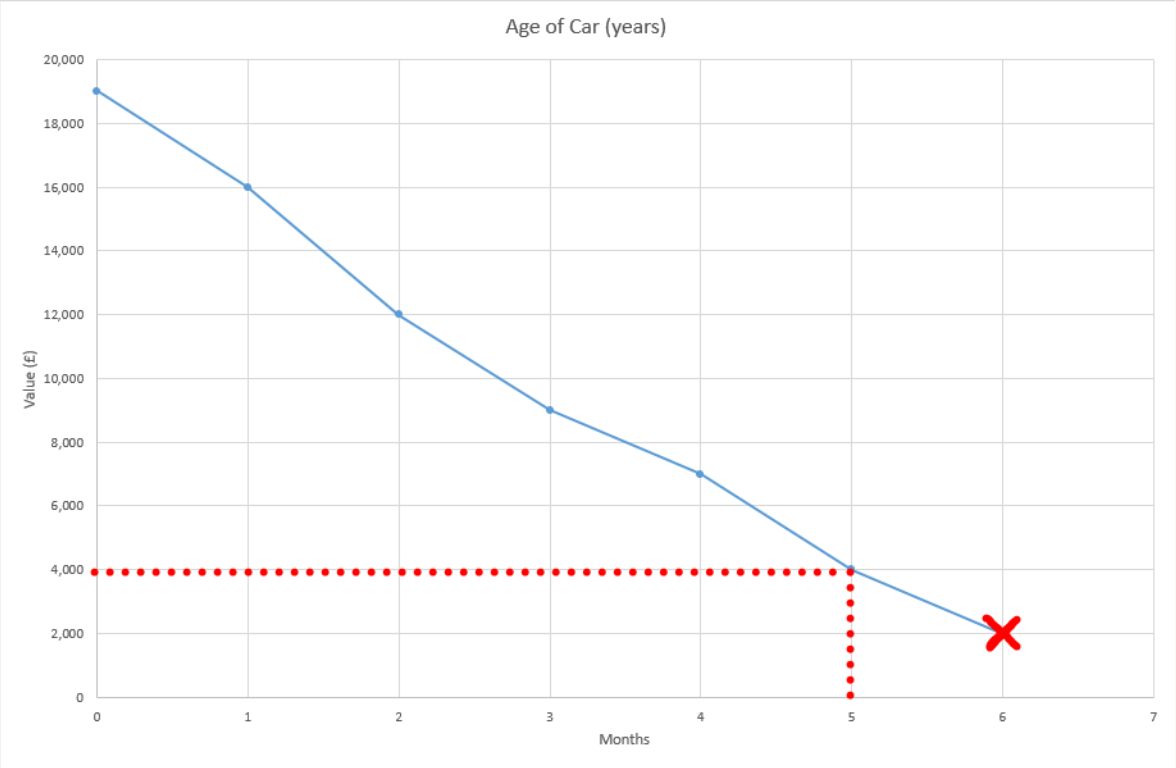
	Tea	Coffee
Monday	4	6
Tuesday	5	8
Wednesday	4	7



a) Write a comment explaining what your bar chart shows.

Line Graphs

Line Graphs are similar to bar charts but instead of bars a line is used to show the data. They are often used to show a trend over a number of days or hours. It is plotted as a series of points, which are then joined with straight lines.

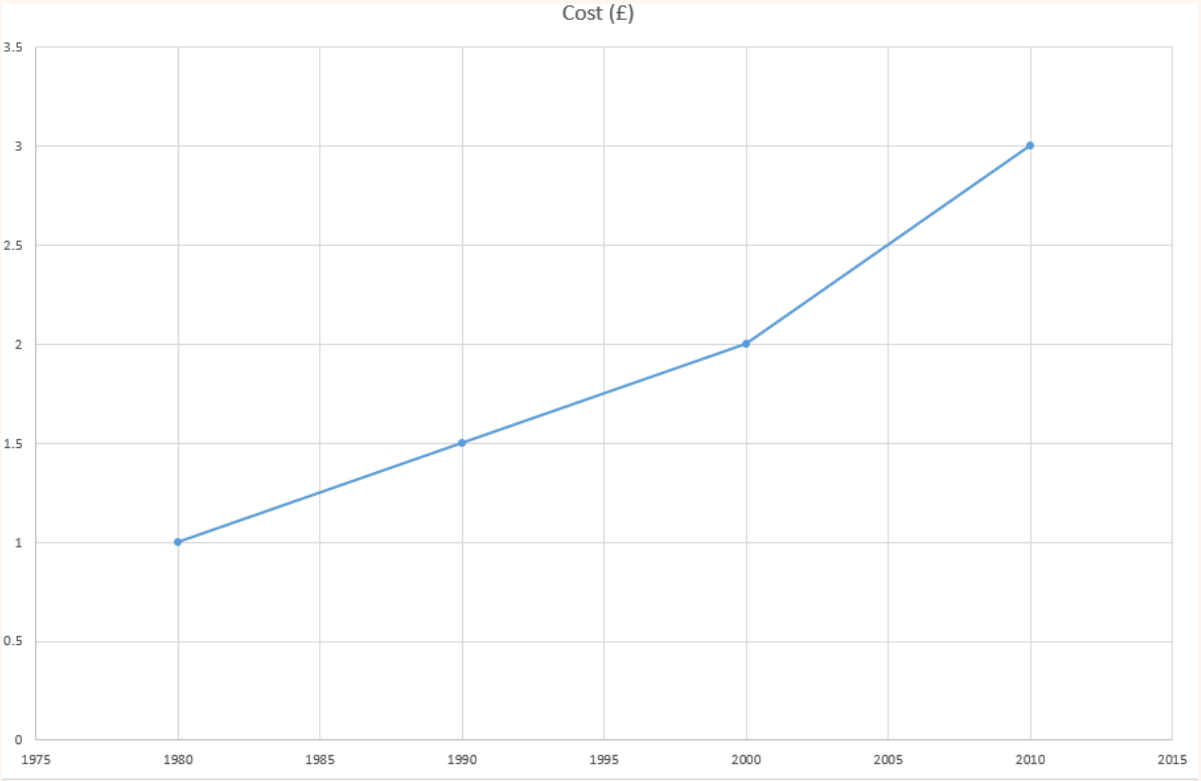


The line graph above shows how the value of a car changes over time.

In the exam you may be asked to write a comment about a line graph included in the exam or one you have drawn.

1. Line graphs are really good at showing how things change over time. The graph above shows that the value of the car is going down year by year.
2. Each cross represents a data point. The cross at the lowest point on the line shows that a six-year-old car is worth £2000 (marked with an x).
3. You can use the graph to find out the value of the car at any time up to 6 years. For example, after 5 years, the car is worth £4000.

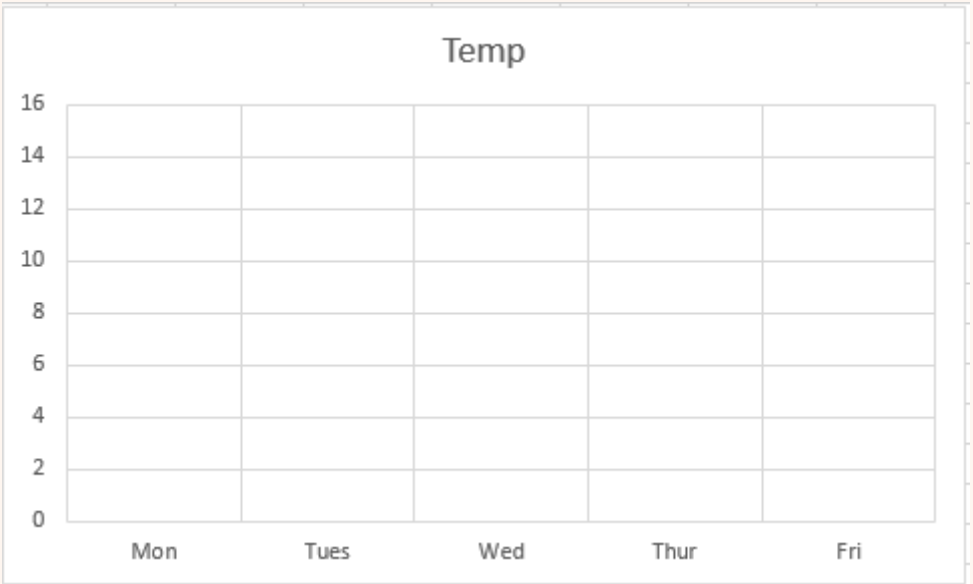
Exam Type Question



1. The line graph above shows the price of a cost of coffee in a café over 30 years. What was the price of a coffee in 2000?
   Answer:

2. Draw the data in the table below on the graph below

Day	Temp
Mon	12
Tues	14
Wed	11
Thur	6
Fri	15

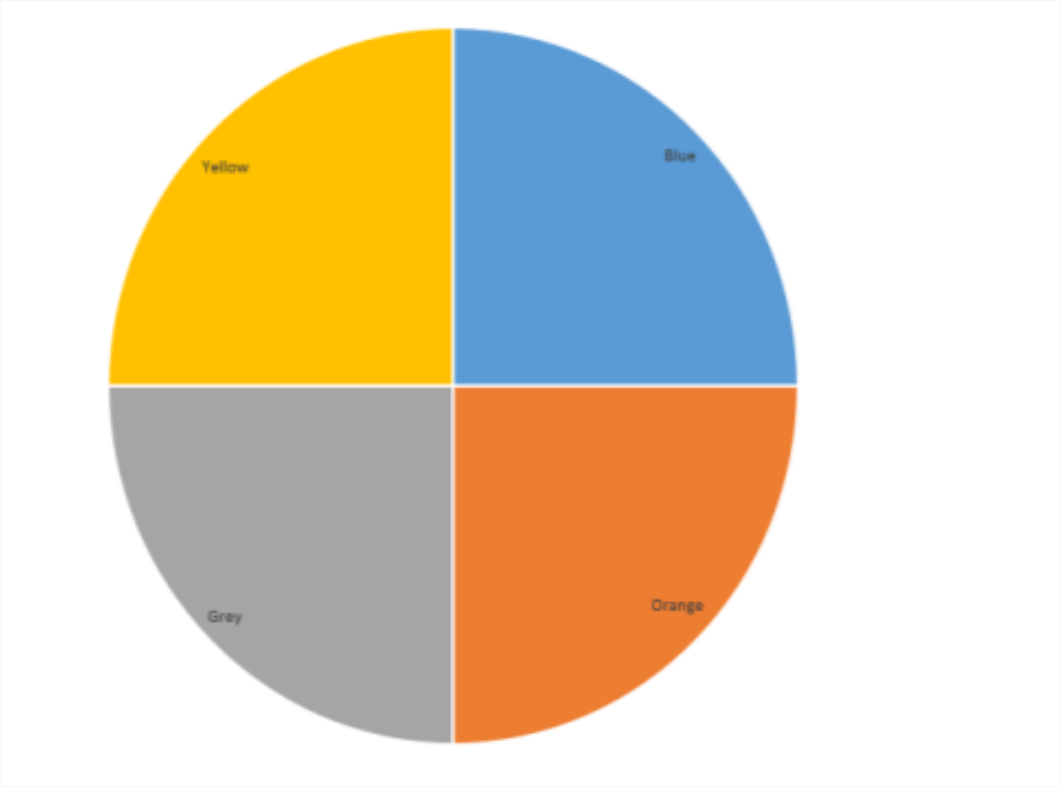


Reading Pie Charts

In this exam, you may be expected to be able to read pie charts. This will involve describing what you see in the pie chart, for example which slice of the pie chart is the biggest. It may also involve working with fractions or percentages.

Example

What fraction of the chart is coloured blue?



Count the number of equal sections on the chart.

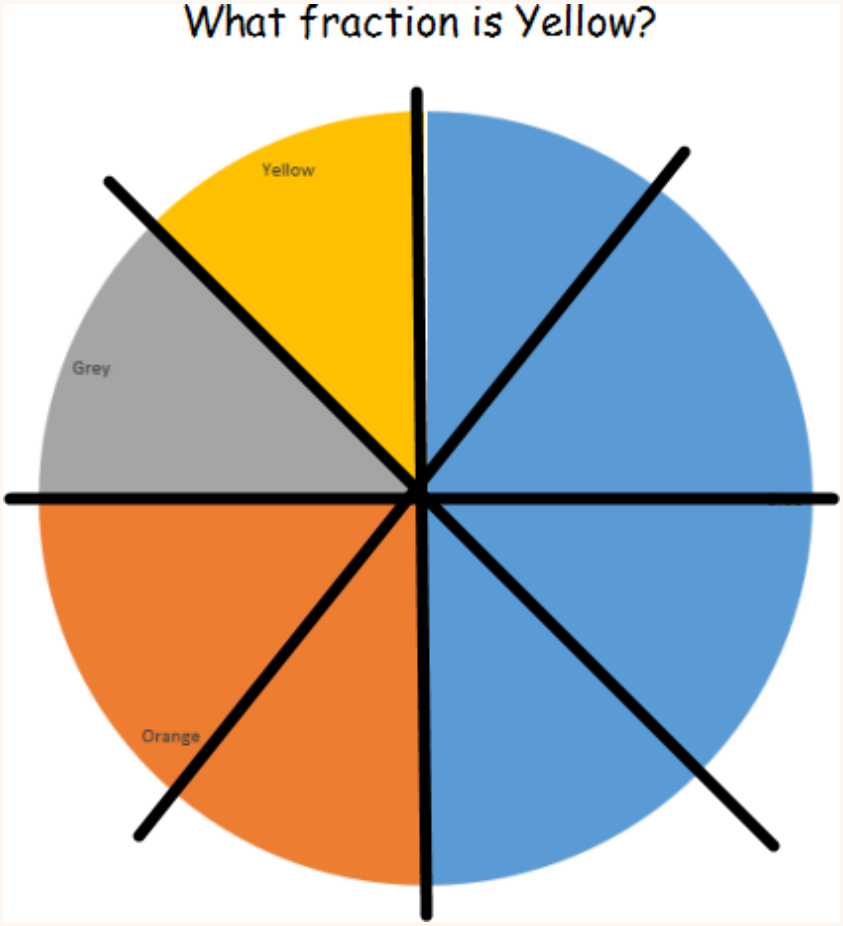
Write this number on the bottom of the fraction.

Count the number of sections you are being asked about.

Write this number on top of the fraction.

$\frac{1}{4}$ or 25%

What fraction is yellow?



Split all the sections up so they are the same size.

Write this number on the bottom of the fraction.

Count the number of sections you are being asked about.

Write this on top.

I split this chart into 8 equal sections = $\frac{1}{8}$

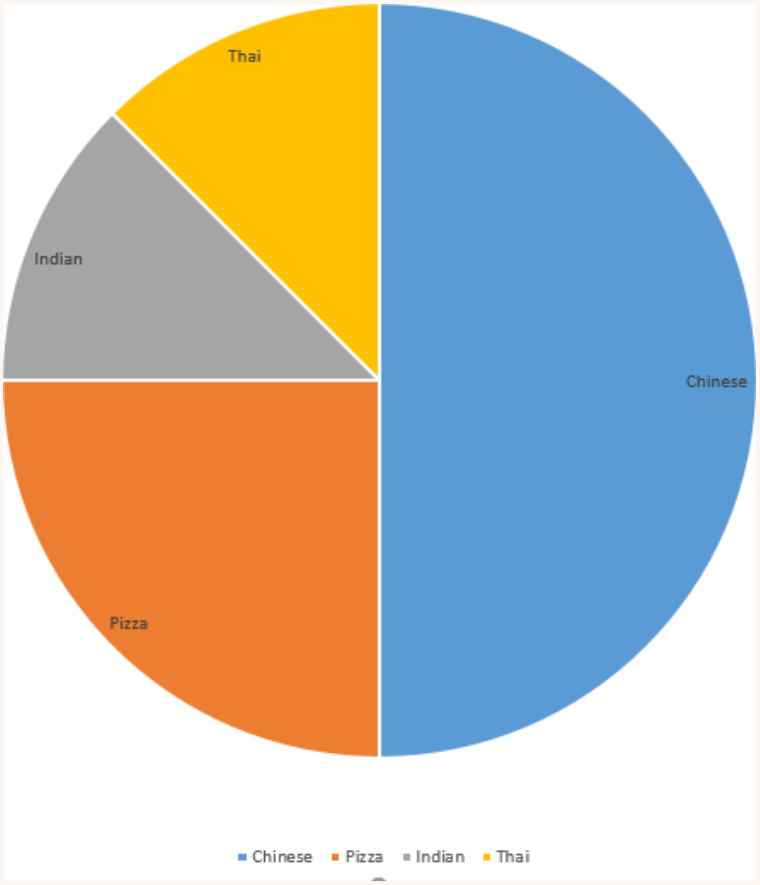
Once you know what a slice of the pie chart represents you can answer lots of different questions.

For example if there were 40 students, how many like the colour grey?

Grey is $\frac{1}{8}$

40 ÷ 8 = 5 students like grey.

Exam Type Question



What was the most popular type of takeaway?

What fraction of those surveyed like Thai food?

If 80 people were surveyed, how many liked pizza?

Drawing Pie Charts

A pie chart is a circular chart of 360 degrees that is split into sections to show proportion. The table below shows students' favourite sports. Follow the steps to create a pie chart for this data.

The total of everything = 360.

Step 1: Divide 360 by the total number of people surveyed to find the angle for each person surveyed.

360 ÷ 60 = 6

Sport	Frequency	Frequency x 6	Angle
Football	20	20 x 6	120
Swimming	5	5 x 6	30
Running	9	9 x 6	54
Netball	12	12 x 6	72
Tennis	14	14 x 6	84
Total	60	60 x 6 =360	360

Step 2: To calculate the angle for each sport, multiply the frequency by 6

20 x 6 = 120

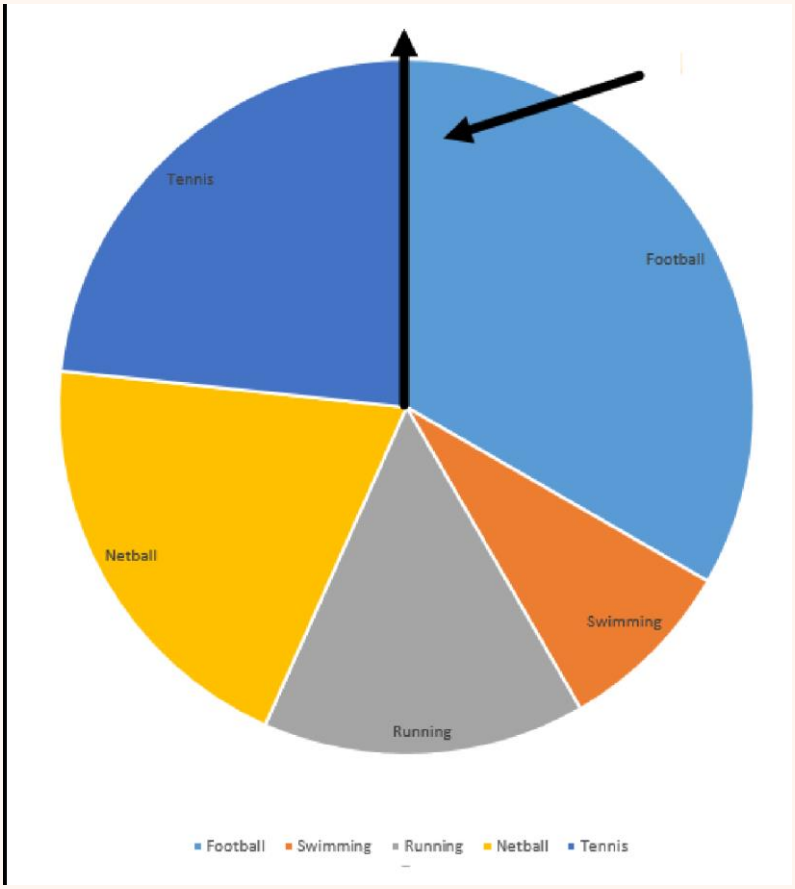
Step 3:

Draw the angle onto your pie chart.

Start by drawing a straight line from the centre of the circle to the edge.

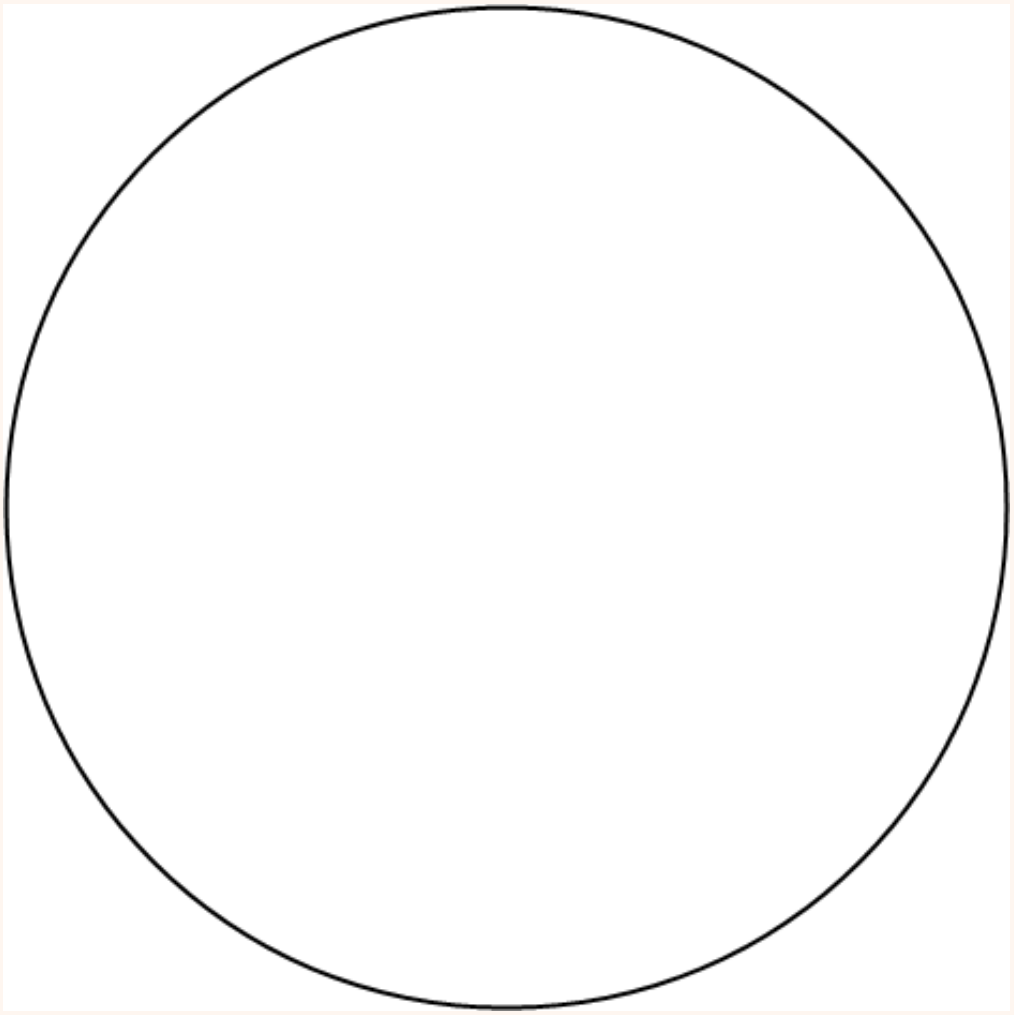
Use a protractor to measure and mark the angle for each sport and label them accordingly make sure to include a title.

Favourite sports



Draw a pie chart to show the following data. Make sure to label and include a title. Favourite Social Media

Platform	Number
Snapchat	4
Whatsapp	2
Twitter	1
Facebook	1



Scatter Graphs

What are Scatter Graphs?

Scatter graphs show the relationship between two sets of data and are good in showing you if there is a link between them. For example, is there a link between a person's height and weight or will ice cream sales go up if the temperature outside goes up?

Plotting Points On A Scatter Graph

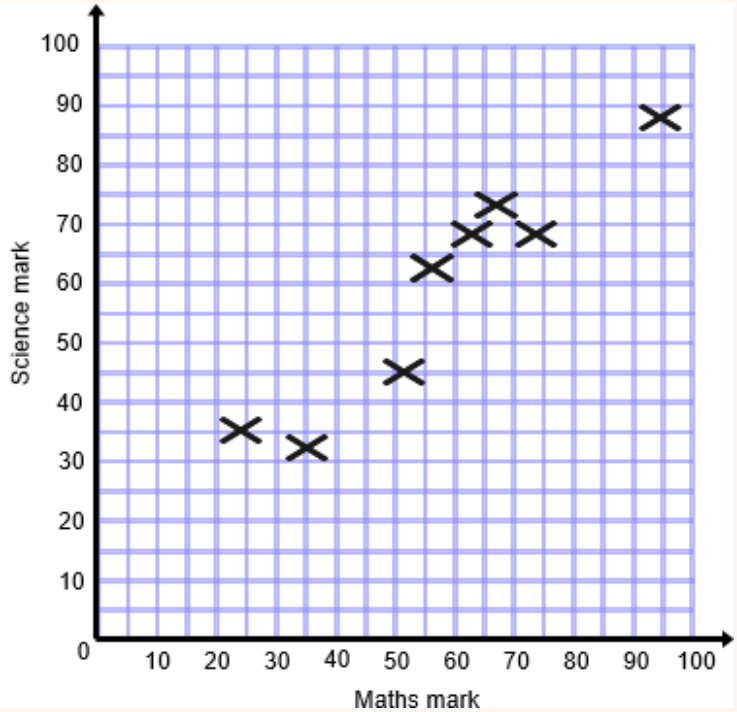
Draw a scatter graph of this information:

Student	A	B	C	D	E	F	G	H
Maths mark	56	73	51	62	24	67	94	35
Science mark	62	68	45	68	35	73	88	32

Method

1. Draw your graph axes (x and y axis)
2. Put a scale on your x and y axes (clue look at the smallest and largest values)
3. Plot the points on the graph, ensuring x and y axis line up.

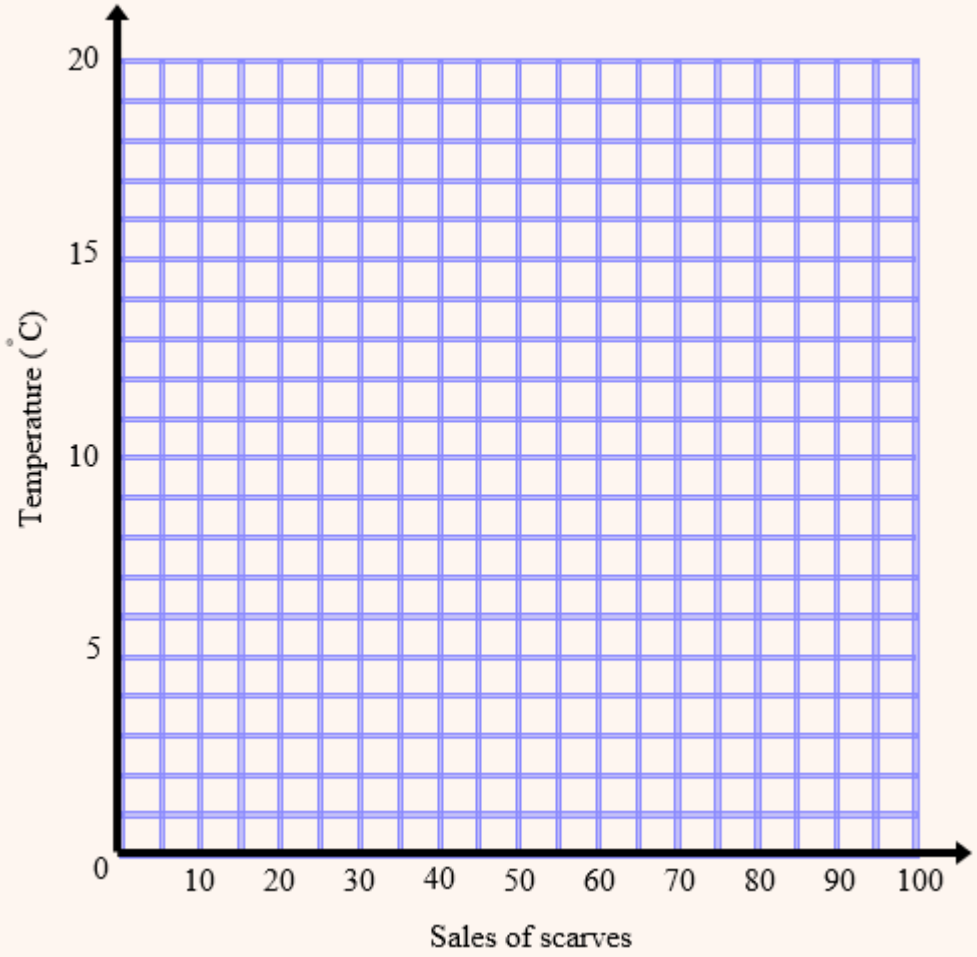
What it should look like:



Plot these points on a scatter graph

The data below shows the number of scarves sold by a shop in a week and the temperature on that day. Plot the points on the scatter graph.

Days of the week	M	T	W	Th	F	Sa	Su
Sales of scarves	73	56	54	38	7	39	82
Temperature	9	11	13	15	19	14	5



Correlation

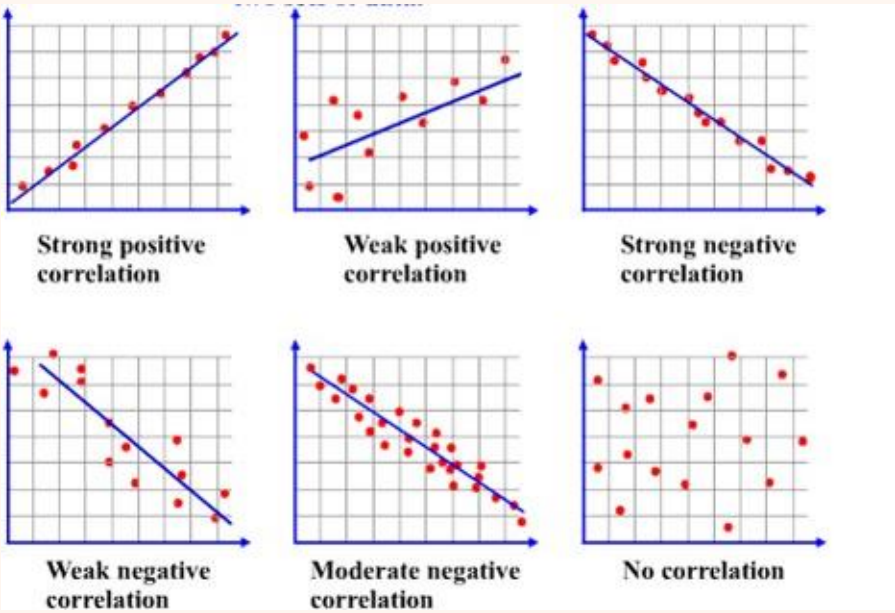
Scatter graphs show the relationship between our two sets of data.

We describe this relationship using correlation.

There are basically 3 types of correlation:

1. Positive
2. Negative
3. No Correlation

The more in line the points are, the stronger the correlation



How do we use Scatter Graphs?

We can use scatter graphs to estimate results based upon other results.

We do this by drawing a 'line of best fit'.

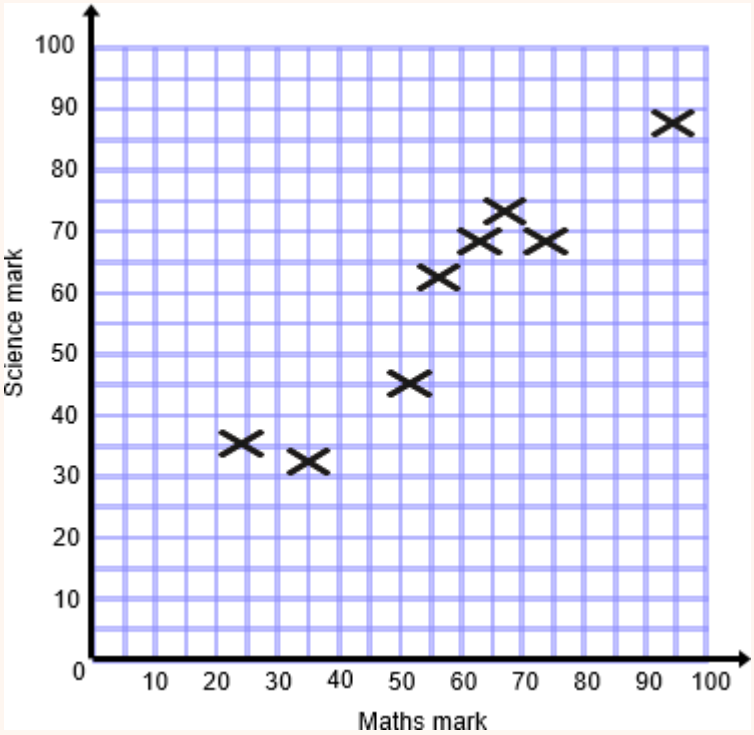
A line of best fit is a straight line (drawn with a ruler) that goes through the middle of your points. This is an estimate, but try to get half of the points on either side of it.

The line of best fit does not have to go through the origin!

When doing an estimate from a scatter graph you must draw the line of best fit.

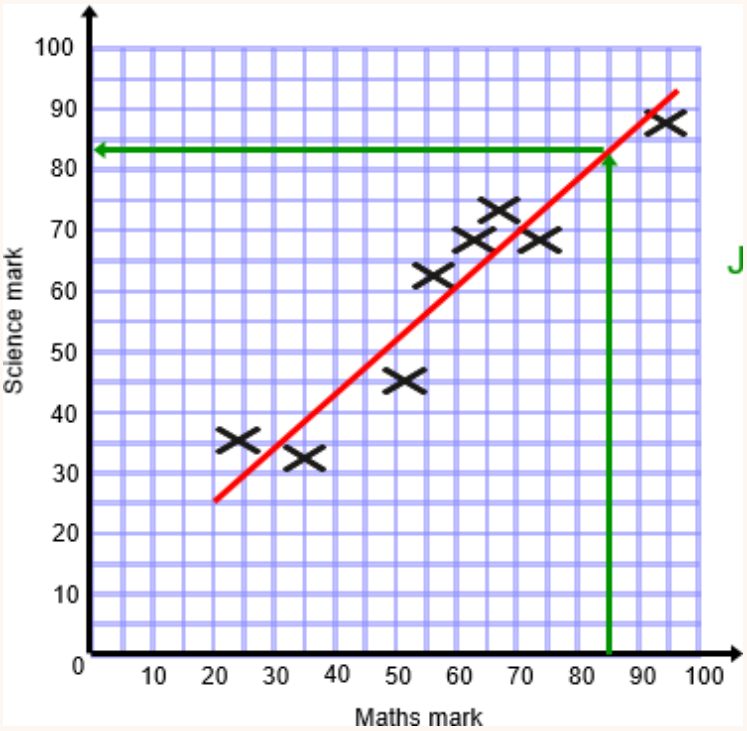
A Typical Exam Question

Jack missed the Science exam because he was ill. He scored 85 in the Maths exam. What would he have got in the Science exam?



Method

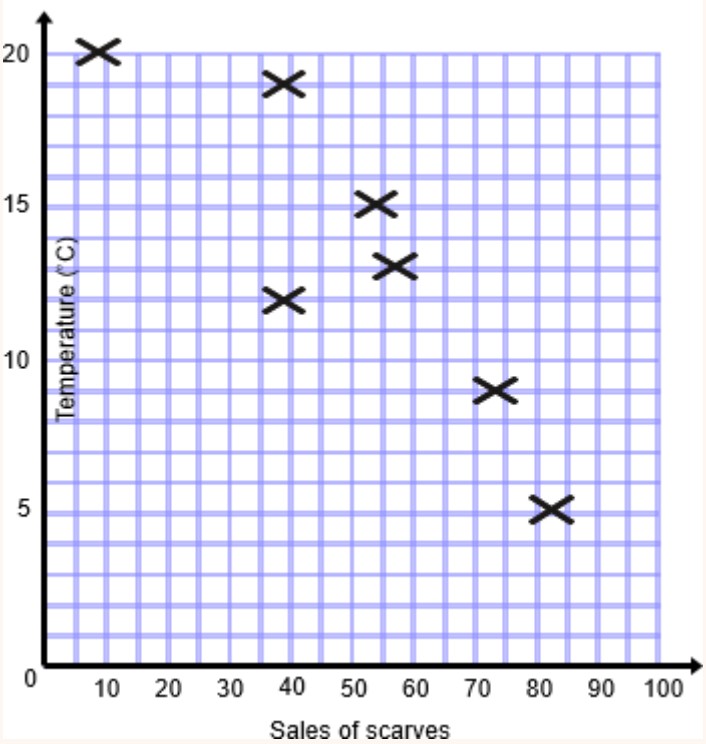
1. Draw a line of best fit.
2. Draw a line up from 85 (the Maths mark) on the x-axis until it hits the line of best fit.
3. When it hits the line of best fit draw a line across.



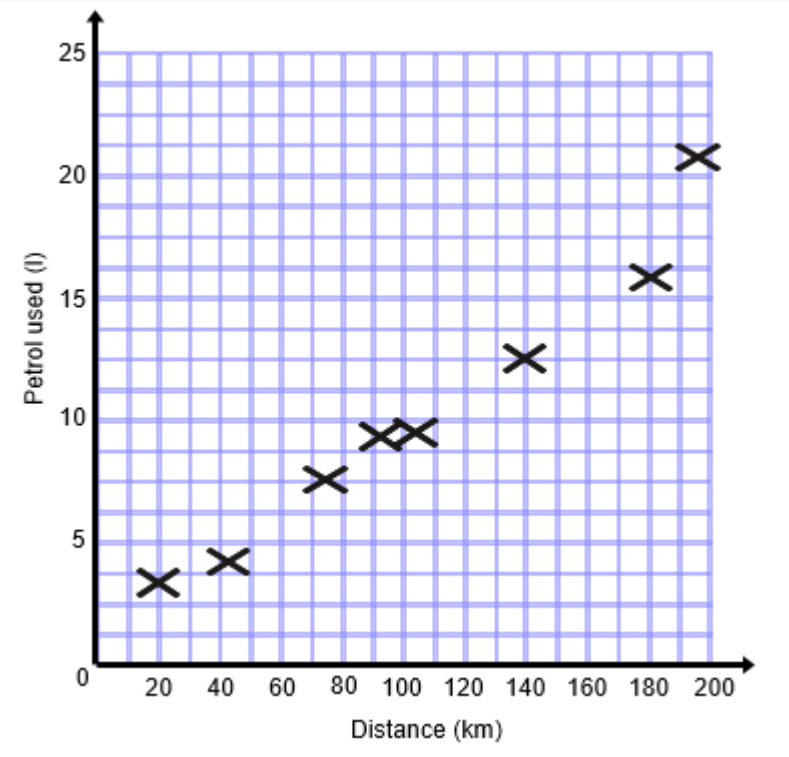
Jack would have got 83.

You try

1. Estimate, using the graph, how many scarves the shop would sell when the temperature was 7°C.

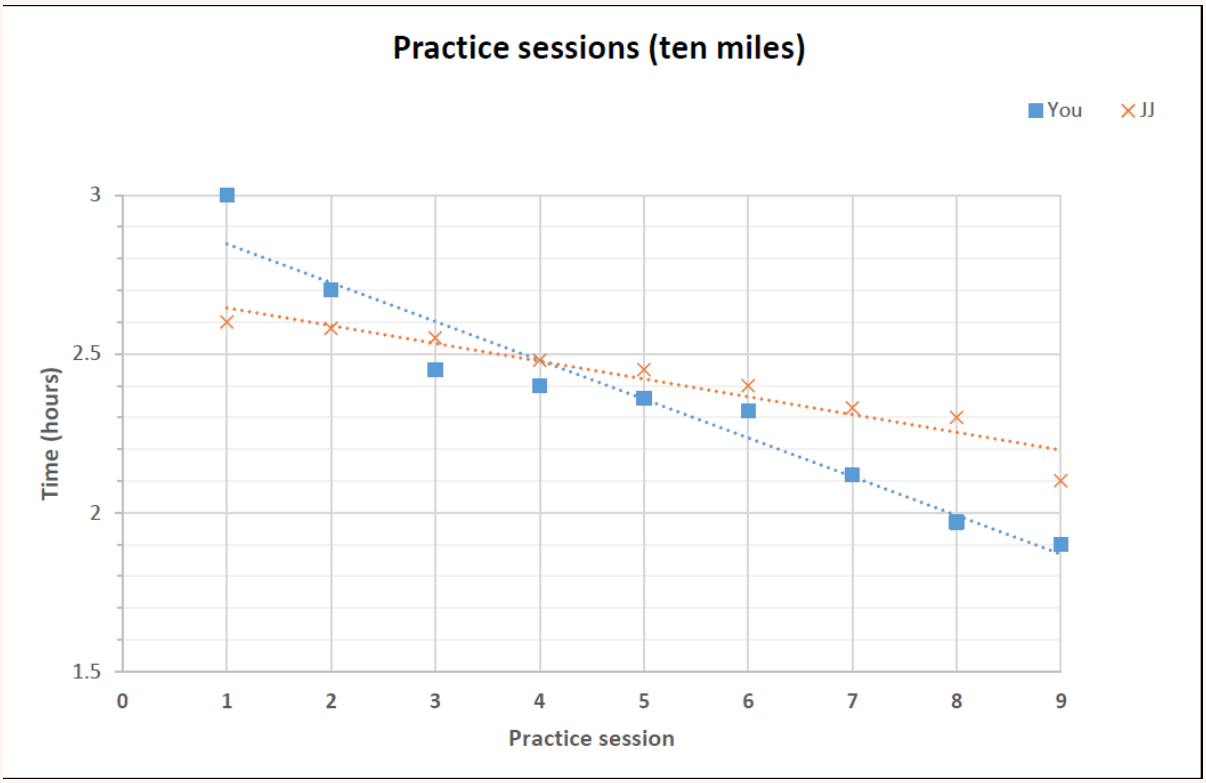


2. Estimate, using the graph, how many litres of petrol the car would use on a journey of 160 km.



You will be expected in the exam to write a comment on what your scatter graph shows you.

Make sure to compare if there is more than one line of best fit, write about what both are doing (are they both getting slower for example) and then compare one against the other (who is quicker than the other for example)



Write two comments comparing the times the two runners above.

Comment 1:

Comment 2:

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