

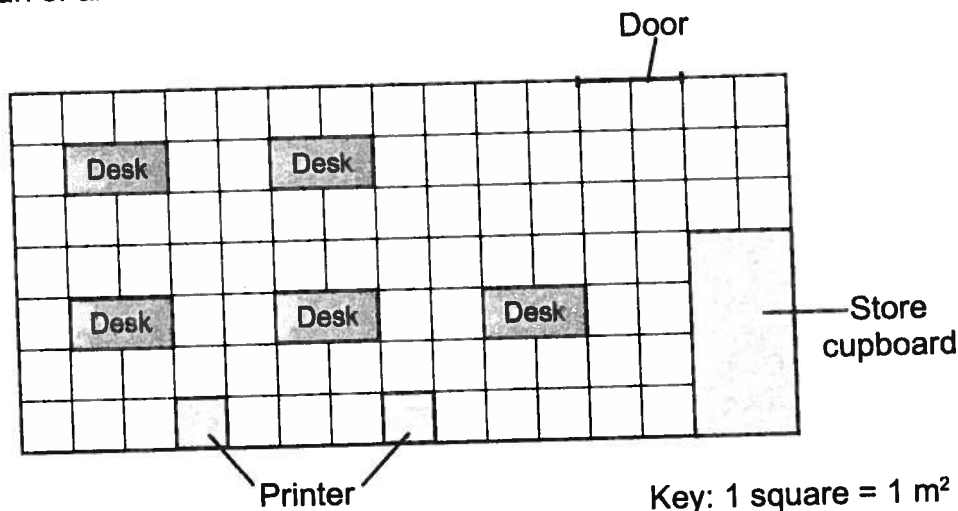
# Plans

## Plans Show How Things are Laid Out in an Area

- 1) A plan shows the layout of an area. For example, a plan might show a room and all the objects in it.
- 2) Plans are drawn as if you are looking down on the area from above — a bird's eye view.

### Example

A plan of an office is shown below:



On this plan each square on the grid represents 1 m<sup>2</sup> in the office.

This means that each square on the grid is equal to 1 m wide and 1 m long.

From this you can work out how large objects are and how far away things are from each other.

The store cupboard covers 8 squares.

This means the store cupboard has an area of:  $8 \times 1 \text{ m}^2 = 8 \text{ m}^2$ .

The room is 7 squares wide.

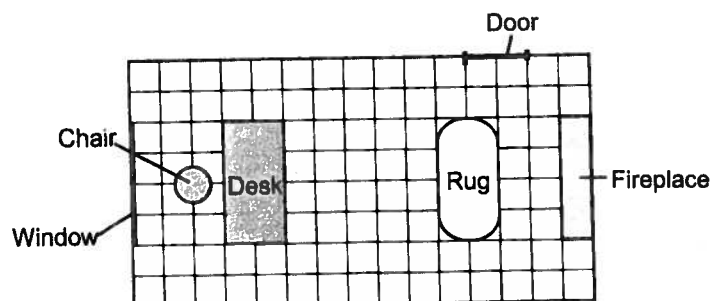
This means that the room is:  $7 \times 1 \text{ m} = 7 \text{ m}$  wide.

## Using Plans

Plans are useful for deciding where a new object will fit in an area.

### Example

Christine has bought a new bookcase for her study. She wants to know where to put the bookcase. A plan of the study is shown below.



Key: the side of  
1 square = 0.5 m.

- The bookcase is 1.5 m wide and 0.5 m deep.
- It must go against the edge of the room.
- It must not be against the fireplace, door or window.
- It must be at least 1 m from the desk.

Choose a place where the bookcase could go. Draw it on the plan.

Answer:

First, you need to work out the size of the bookcase in squares.

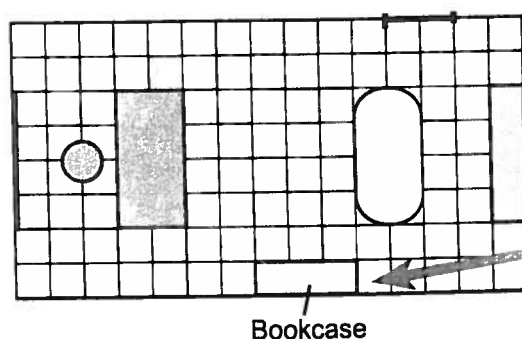
The key tells you that each square is equal to 0.5 m wide and 0.5 m long.

The bookcase is 0.5 m deep, so it must be 1 square deep.

The bookcase is 1.5 m wide:  $1.5 \div 0.5 = 3$ .

So the bookcase is 3 squares wide.

The bookcase fits into the space along the bottom wall.



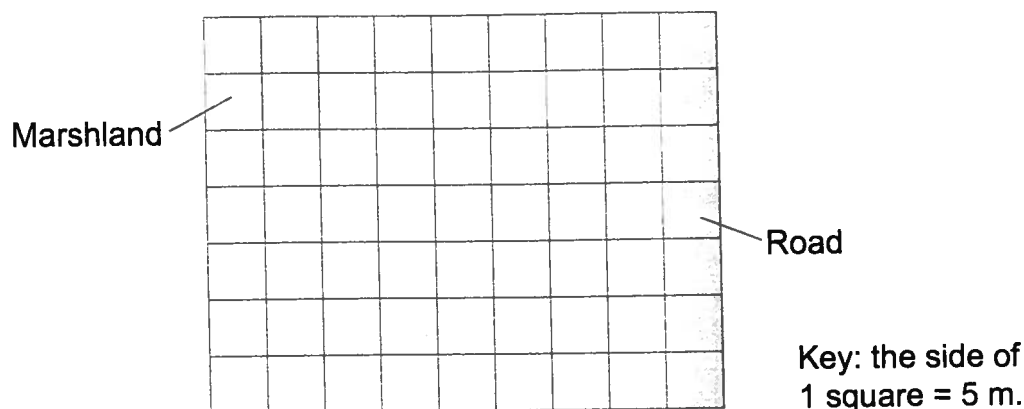
This isn't the only place the bookcase can go, but it meets all the conditions set out in the question.

Double check that the position of the bookcase meets all the conditions set out in the question.

For example, that it's at least 1 m (2 squares) from the desk.

## Practice Questions

- 1) Dean has bought a plot of land. He wants to build two houses on it. A plan of the land is shown below.



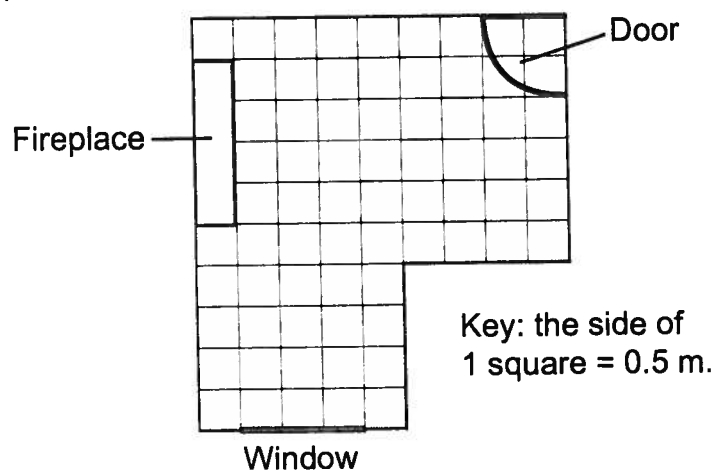
Each house should be 10 m wide and 15 m long.

The houses should be at least 5 m apart.

It is not possible to build on the marshland or the road.

Choose a place where each house could go. Draw them on the plan.

- 2) Lucy has bought a new table for her dining room. She wants to know where to put it. A plan of Lucy's dining room is shown below.



The table is 1.5 m wide and 2 m long.

Lucy wants there to be a space of at least 0.5 m all the way around the edge of the table.

- Draw on the plan where Lucy could put the table.
- Lucy finds a cupboard that is 2.5 m wide and 1 metre deep. It must go against the edge of the room, but shouldn't block the window, fireplace or door.

Is it possible to fit the cupboard in the room along with the dining table?

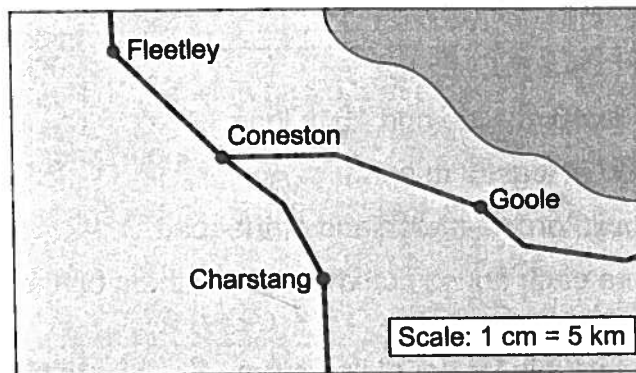
# Maps and Map Scales

## You Need to Know How to Use a Map Scale

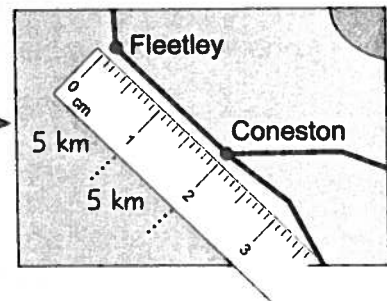
- 1) A map scale tells you how far a given distance on a map is in real life. For example, a scale of 1 cm to 1 km means that 1 cm on the map equals 1 km in real life.
- 2) You might be asked questions involving maps and map scales in your test.

### Example 1

Look at the map. What is the distance between Fleetley and Coneston in km?



- 1) Put your ruler against the bit you're finding the length of. Make sure the zero on the ruler is lined up with the starting place (in this case, Fleetley).
- 2) Mark off each whole cm and write the distance in km next to each one. In this case, 1 cm equals 5 km.
- 3) Add up all the km you just marked. So between Fleetley and Coneston:  $5 \text{ km} + 5 \text{ km} = 10 \text{ km}$ .

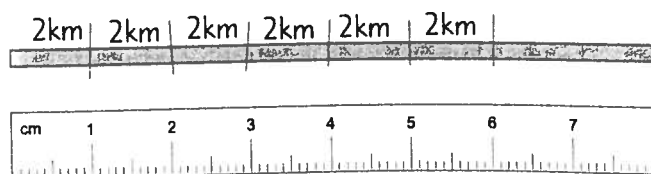


### Example 2

A map is drawn on a scale of 1 cm to 2 km.  
If a road is 12 km long in real life, how long will it be in cm on the map?

Start by drawing the road as a straight line:

Mark off each cm and fill in how many km each one is:



Keep going until the km add up to the full distance (12 km in this case).  
Then just count how many cm long your line is — in this case it's 6 cm.

## Practice Questions

1) A map is drawn with a scale of 1 cm to 4 km.

a) If a road is 16 km in real life, how long will it be in cm on the map?

.....

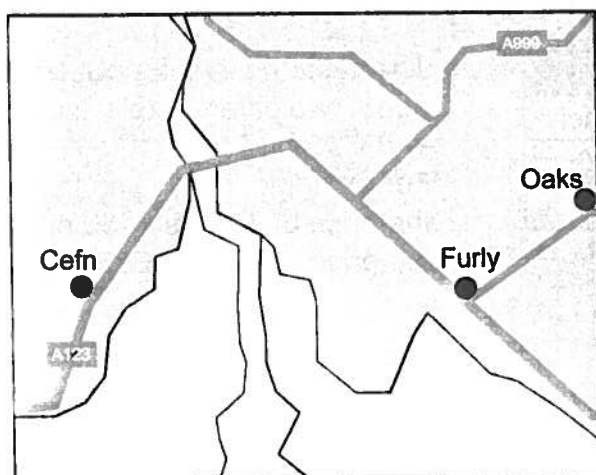
.....

b) If a road is 5 cm on the map, how long will it be in real life?

.....

.....

2) Simon is going to visit his friend Tim in Furly.  
He looks at a map to work out how far away Tim lives.



Scale: 1 cm = 4 miles

a) Simon lives in Oaks. How many miles will he have to travel to get to Tim's by road?

.....

.....

b) Simon and Tim decide to drive from Tim's house to Cefn.  
How many miles is this journey?

.....

.....

.....

.....

# Tables

## Tables are a Way of Showing Data

Tables show information in columns and rows.

### Examples

This table shows the names of staff based on different floors of an office block.

This is a row.

Ground floor	First floor	Second floor
Tim	Mike	Janet
Jackie	Angela	Nick
Louis	Sarah	Brenda
Tony	Steve	Nicole
Steph	Drew	Anja

This is a column.

This table has row headings as well as column headings.

	TV A	TV B
Screen	37 inch	40 inch
HD	720p	1080p
Colour	Black	Silver
Price (£)	450	550

This table holds information about two different televisions — TV A and TV B.

For example, it tells you that the price of TV A is £450 and the price of TV B is £550.

## Mileage Charts give the Distances Between Places

Mileage charts tell you the distance between different places.

### Example

Use the mileage chart on the right to find the distance from Bristol to Portsmouth.

Exeter			
84	Bristol		
159	78	Reading	
128	93	54	Portsmouth

Distances are shown in miles.

- 1) Put fingers on 'Bristol' and 'Portsmouth' and move them towards each other.
- 2) Where your fingers meet is the distance between the two places — 93 miles.

Exeter			
84	Bristol		
159	78	Reading	
128	93	54	Portsmouth

Below is another type of mileage chart you might see.

### Example

Use the mileage chart below to find the distance from Bristol to Portsmouth.

1) Find 'Bristol' on one side of the chart and 'Portsmouth' on the other.

2) Put fingers on 'Bristol' and 'Portsmouth' and move them towards each other — where your fingers meet is the distance between the two places.

3) It doesn't matter if you've followed the path of the green arrows or the black ones — the answer will be 93 miles.

	Exeter	Bristol	Reading	Portsmouth
Exeter		84	159	128
Bristol	84		78	93
Reading	159	78		54
Portsmouth	128	93	54	

Distances are shown in miles.

## Practice Questions

1) The table on the right shows details of three different hotels. Use the table to answer the following questions.

a) How far is Hotel B from the city centre?

.....

b) Which hotel is rated as 5-star?

.....

c) Which hotel has parking and a swimming pool?

.....

	Hotel A	Hotel B	Hotel C
Distance from city centre (miles)	0.5	1.2	0.1
Star rating	4	4	5
Parking?	Yes	Yes	No
Swimming pool?	Yes	No	Yes
Price per night (£)	86	72	112

2) Use the mileage chart to answer the following questions. Distances shown are in miles.

York			
37.6	Bradford		
27.6	9.9	Leeds	
59.7	42.5	37.8	Sheffield

a) What is the distance between Bradford and Sheffield?

.....

b) What is the distance between York and Leeds?

.....

c) Steve is driving from York to Bradford and then on to Sheffield. How long is his journey?

.....

## Completing Tables

You might be asked to complete a table as part of your test.

### Example

Sam is re-tiling a bathroom in a house he is refurbishing. He needs to buy 152 wall tiles and 29 floor tiles.

Wall tiles are sold in packs of 20 for £24.

Floor tiles are sold in packs of 15 for £22.50.

He has drawn up a table to keep track of his costs. Complete the table below.

Type of tile	Number of tiles needed	Number of packs needed	Pack price (£)	Total cost (£)
Wall	152		24	
Floor	29		22.50	

- 1) Firstly, work out the number of packs needed.

Number of packs needed = tiles needed ÷ number of tiles in a pack

Wall tiles =  $152 \div 20 = 7.60$

Floor tiles =  $29 \div 15 = 1.93$

Sam can only buy whole packs of tiles, so he needs 8 packs of wall tiles and 2 packs of floor tiles — write this in the table.

Type of tile	Number of tiles needed	Number of packs needed	Pack price (£)	Total cost (£)
Wall	152	8	24	
Floor	29	2	22.50	

- 2) Next, work out the total cost for each type of tile.

Total cost of each type of tile = number of packs needed x pack price

Total cost of wall tiles =  $8 \times £24 = £192$

Total cost of floor tiles =  $2 \times £22.50 = £45$

Write your answers in the table.

Type of tile	Number of tiles needed	Number of packs needed	Pack price (£)	Total cost (£)
Wall	152	8	24	192
Floor	29	2	22.50	45



## Practice Questions

- 1) Lynn is working out the number of days off that each of her employees should have next year. They all get 25 days off as standard, but some receive extra days.

Complete the table that Lynn has started below.

Employee	Standard days off	Extra days off	Total days off
Mike	25	5	
Sharon	25	2	
Lucy	25	0	
Phoebe	25	1	

- 2) Rikesh is supplying food for two weddings. He needs to work out how many food platters to supply to each party and the total cost of the platters. A platter serves 7 people and costs Rikesh £20 to make. Complete the table below.

	Number of guests	Number of platters required	Total cost of platters (£)
Wedding 1	120		
Wedding 2	80		

- 3) At a classic car show a group of cars are being judged to see which will win the 'best in show' award.

The judges give points to each car based on the interior, exterior and mechanical condition. For each of these criteria the judges can award up to 10 points.

The judges also look for modifications — cars lose 1 point for each modification they have.

Complete the table to show the final results.

	Interior score	Exterior score	Mechanical score	Number of modifications	Total score
Car 1	8	7	7	0	
Car 2	7	9	9	2	
Car 3	6	9	7	1	

# Drawing Tables

## Drawing Tally Charts and Frequency Tables

You can use a tally chart to put data into different categories.

### Example

The tally chart below shows the types of fish caught by a fisherman.

There are 4 haddock.  
There are 2 cod.  
There are 2 plaice.  
There are 7 herring.  
There is 1 dab.

Fish	Tally
Haddock	IIII
Cod	II
Plaice	II
Herring	IIII II
Dab	I

If another cod was caught by the fisherman you would add another line (tally mark) to the tally column next to cod.

In a tally, every 5th mark crosses a group of 4 like this: IIII  
So IIII II represents 7  
(a group of 5 plus 2).

You can add another column to make a frequency table.  
You fill this in by adding up the tally marks for each fish.

Check the frequencies — the total should be the same as the number of tally marks (fish).

Colour	Tally	Frequency
Haddock	IIII	4
Cod	II	2
Plaice	II	2
Herring	IIII II	7
Dab	I	1
		Total: 16

## Practice Question

- 1) Julie's shop makes cakes for celebrations. Today she received orders for 2 birthday cakes, 2 wedding cakes, another birthday cake, a christening cake, a retirement cake, 3 Christmas cakes, another christening cake and another 2 birthday cakes.

- a) Complete the table on the right using the information above.
- b) How many birthday cake orders are there?  
.....
- c) What was the total number of cake orders?  
.....

Type of cake	Tally	Frequency
Birthday		
Wedding		
Christening		
Retirement		
Christmas		
		Total

## Designing Tables

- 1) Tables are useful for organising data so that it's easy to understand.
- 2) In the test you could be asked to design a table to collect or display data.
- 3) There isn't just one right way to do this — it all depends on what data the table needs to show.
- 4) If you're asked to draw a table make sure you...
  - Include enough rows for all the data (if you know how much data will be stored in it) and any column or row headers that are needed.
  - Include space to show everything the table needs to. (Check this again after you've drawn your table.)
  - Think about how the table will be used — if you're using it to keep track of how many of something there are then a tally chart or a frequency table might be best.

### Example

Laura is organising a dinner party for 8 guests. Some of her guests have special diets. The special diets are vegetarian, vegan, gluten-free and nut allergy.

Laura wants to design a table to show each guest's diet, as well as the total number of guests that have each type of diet. Some guests do not have a special diet — she wants to show this in the table as well.

The table could look like this:

Guest	Special diet				No special diet
	Vegetarian	Vegan	Gluten-free	Nut allergy	
	Total:	Total:	Total:	Total:	Total:

There's space for each of the 8 guests' diets to be shown.

Make sure you include space for all the information — Laura wanted to include the total number of people with each diet so there needs to be somewhere to show that.

The type of diet for each guest can be shown by putting a tick under the diet type.

Practice Questions

- 1) Terry is an electrician. He needs to place an order with his supplier.

Design a table that Terry could use to record the details of the order. The table should have space to record what items he is ordering, the number of each item he is ordering, the price of each item and the total cost of the order.

- 2) Debbie is organising a meal out for five family members.  
There are 3 choices of starter, 3 choices of main meal and 3 choices of dessert.

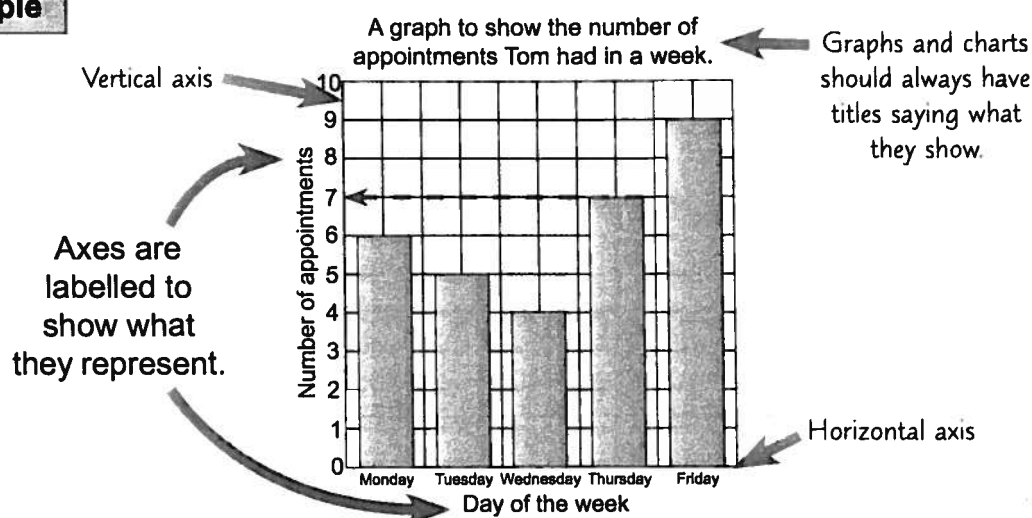
Design a table that Debbie could use to record the choices of each guest and the total number of people ordering each option.

# Bar Charts

## Bar Charts Let You Compare Data Easily

- 1) A bar chart is a simple way of showing information.
- 2) On a bar chart you plot your data using two lines called axes (if you're talking about just one then it's called an axis).

### Example



- 1) The height of each bar shows how many appointments Tom had each day.
- 2) Just read across from the top of the bar to the number on the vertical axis. For example, on Thursday Tom had 7 appointments.
- 3) You can draw conclusions from the chart. For example, you can see Tom had the most appointments on Friday as it's the day with the tallest bar.

## Practice Question

- 1) The bar chart shows the number of different colours of kite that were seen at a kite festival.

a) How many green kites were seen?

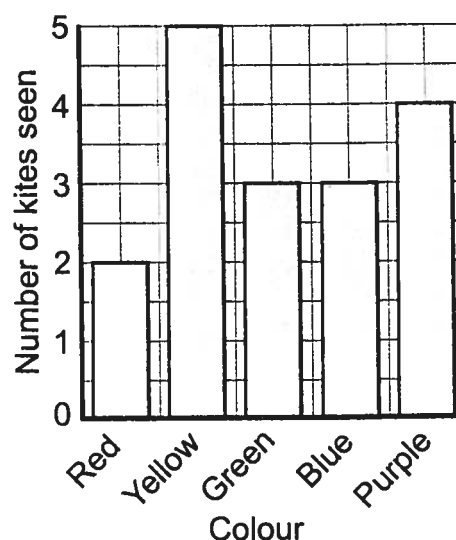
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b) Which colour was seen the most often?

.....

c) How many kites were seen altogether?

.....



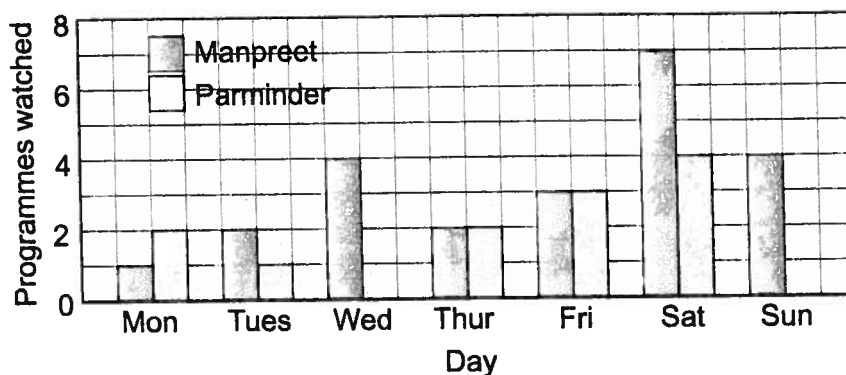
## Dual Bar Charts Can be Used to Compare Data Sets

Dual bar charts show two sets of data at once so it's easy to compare the data. Each category has two bars — one for each data set.

### Example

The dual bar chart below shows the number of TV programmes that Manpreet and Parminder watched in a week.

- 1) Each day has two bars — one for Manpreet and one for Parminder.
- 2) A different shade of blue is used for each person — the key shows you which colour represents which person. For example, the chart shows that on Saturday Manpreet watched 7 programmes and Parminder watched 4

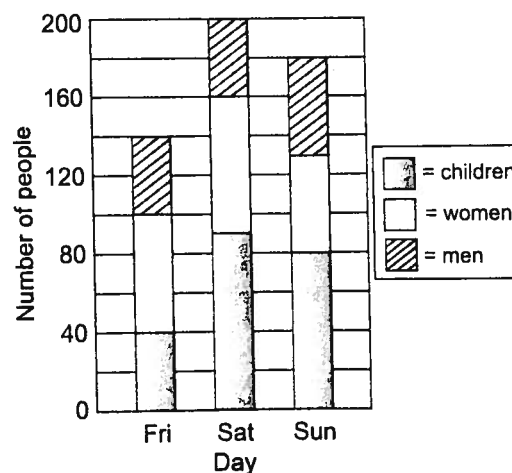


## Composite Bar Charts Show Proportions

- 1) A composite bar chart has bars that are split into sections.
- 2) The height of the bar shows the total amount of something.
- 3) The sections show how that amount is broken down into different categories.

### Example

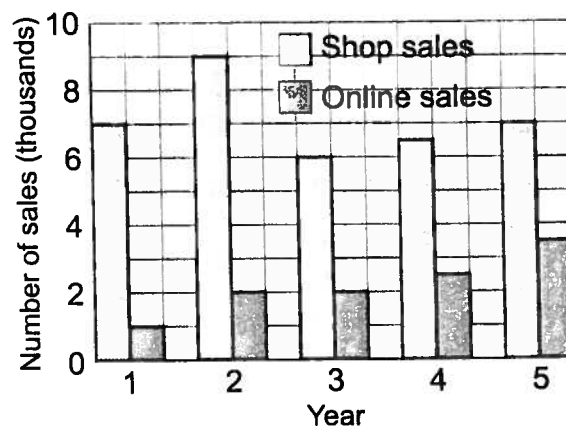
- 1) The chart shows the number of men, women and children visiting a country show over 3 days.
- 2) The height of each bar shows the total number of visitors each day. For example, 200 people visited the show on Saturday.
- 3) The sections of the bars show how many men, women and children visited the show each day. For example, on Saturday 40 men, 70 women and 90 children visited the show.



## Practice Questions

- 1) A business sells clothes in a shop and also through its website.

The graph on the right shows the number of shop sales and online sales over the past 5 years.



- a) How many shop sales were there in year 3?

.....

- b) How many more shop sales were there in year 2 than year 3?

.....

- c) How many more shop sales were there than online sales in year 3?

.....

- d) In which year were the number of shop sales and online sales the closest in number?

.....

- 2) The bar chart below shows the destinations that a UK-based airline flew to over 3 years.

- a) What percentage of flights were to Europe in year 1?

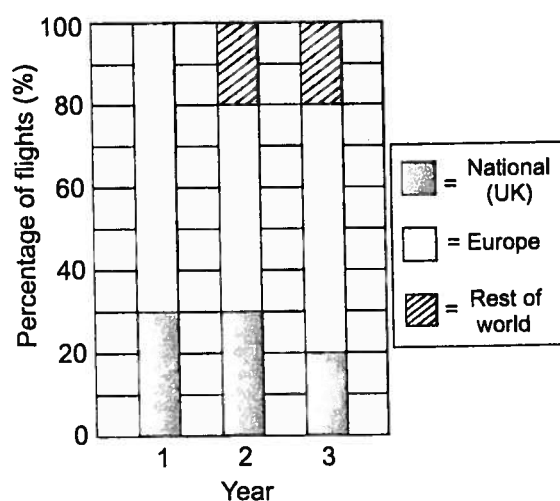
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- b) How much did the number of flights to Europe decrease by from year 1 to year 2?

.....

- c) In which year was the proportion of national flights and flights to the rest of the world the same?

.....



- d) Describe how the percentage of flights to places within the UK changed from year 1 to year 3.

.....

.....

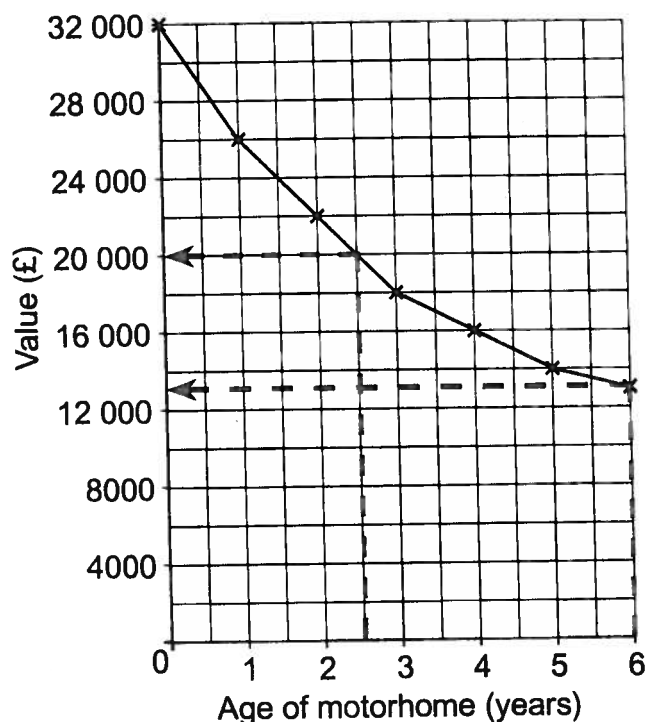
# Line Graphs

## Line Graphs Show the Relationship Between Two Things

Line graphs are similar to bar charts but instead of bars, a line is used to show the data.

### Example

The line graph below shows how a motorhome's value changes over time.



Sometimes line graphs don't have crosses on each plotted point — there's just a line to show the data.

- 1) The graph shows that the value of a motorhome goes down as it gets older. You can tell this because the line slopes downwards.
- 2) Each cross represents a data point. For example, the highest cross on the graph shows the motorhome was worth £32 000 when it was new. The lowest cross shows that a 6-year old motorhome is worth £13 000.

The gap between each value on the vertical axis is 2 squares and represents £4 000.

This means each square represents £2 000 and half a square represents £1 000.

So the point half a square above £12 000 represents a value of £13 000.

- 3) You can use the graph to find the value of a motorhome at any time up to 6 years. For example, to find the value after two and a half years...
  - Find the age on the horizontal axis — two and a half years is halfway between two years and three years.
  - Move directly upwards until you meet the line.
  - Go across from this point until you meet the vertical axis. The value at this point (£20 000) is the value after 2 and a half years.



## Line Graphs Can Have More Than One Line On Them

If there's more than one set of data shown on a line graph you get more than one line.

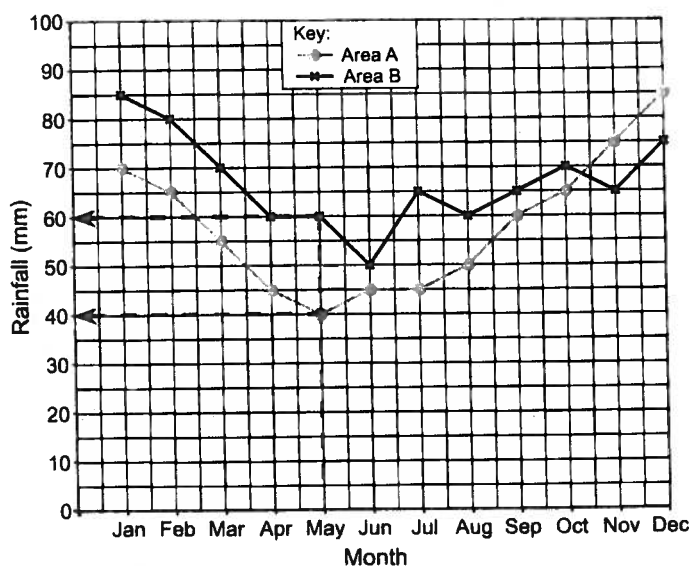
### Example

This graph shows rainfall in two different areas over 12 months.

There is a separate line to show rainfall in each region.

Using the graph it's easy to compare rainfall in the different regions. For example, in May, there was 60 mm of rainfall in Area B and 40 mm of rainfall in the Area A.

There's more on interpreting line graphs on page 101.

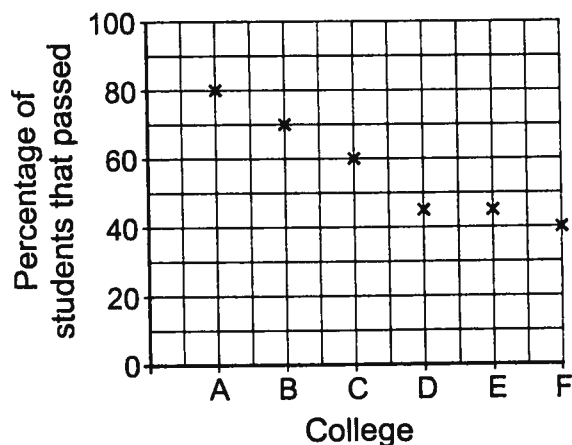


## In Some Graphs the Points Aren't Joined Up

Some graphs just show the points — there's no line to join them up.

### Example

The graph below shows the percentage of students at different colleges who passed an exam.

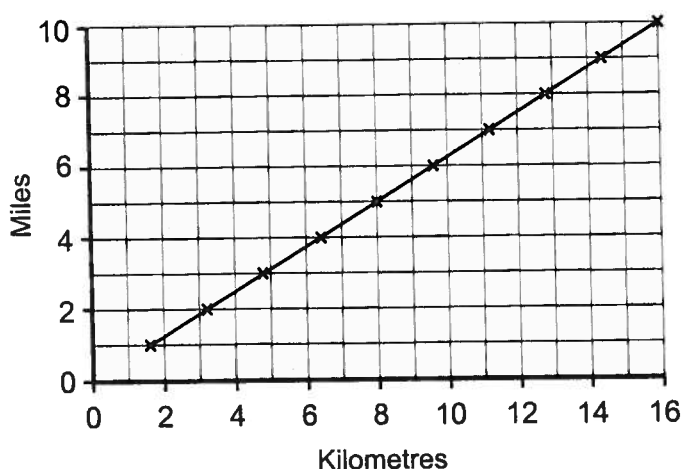


From the graph on the left you can read off the percentage of students who passed the test from each college.

For example, the college with the highest pass rate was college A (80% of students passed). The college with the lowest pass rate was college F (only 40% of students passed).

# Practice Questions

- 1) The graph below can be used for changing miles into kilometres.



- a) What is 5 miles in kilometres?

.....

- b) What is 12 kilometres in miles?

.....

- c) What is 14 kilometres to the nearest mile?

.....

- 2) The line graph shows daily water use by two families — the Pearsons and the Cowells.

- a) What was the Pearsons' average water use per person on day 3?

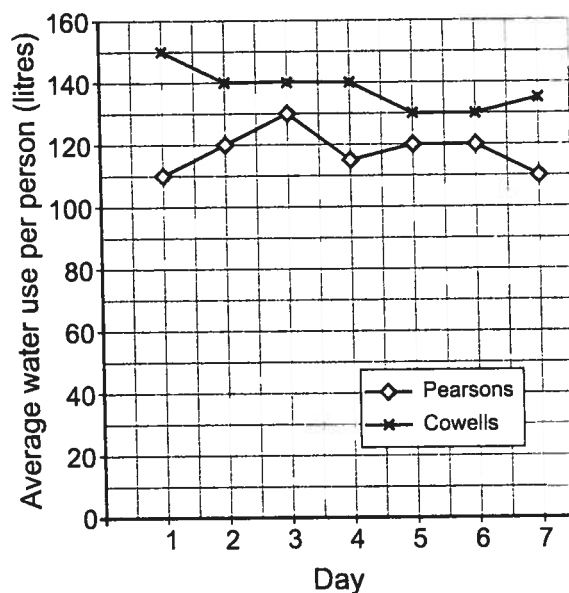
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- b) By how many litres did the Cowells' average water use per person fall from day 4 to day 5?

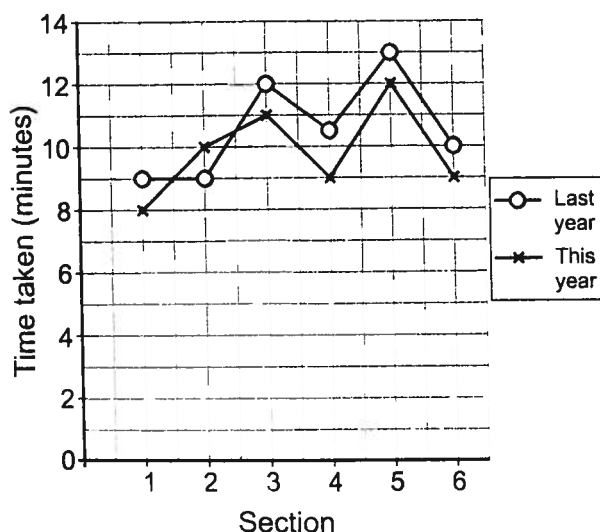
.....

- c) On which day was the difference between the two families' average water use per person the largest?

.....



- 3) Dave has entered a cycling race for the past two years. He has drawn a line graph to compare his times for the different sections.



- a) What was Dave's time for section 2 this year?

.....

- b) What was Dave's time for section 5 last year?

.....

- c) What was the difference between Dave's time for section 4 last year and this year?

.....

## Other Charts and Graphs

### Pie Charts Show How Something is Split Up

- 1) Pie charts are circular and are divided into sections.
- 2) The size of each section depends on how much or how many of something it represents.

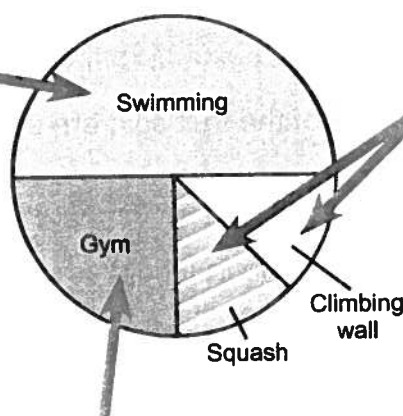
#### Example

This pie chart shows the most popular activities at a leisure centre.

The size of each section shows how many people prefer that activity.

This section is the biggest, so swimming is the most popular activity.

It's  $\frac{1}{2}$  (50%) of the chart. This means that  $\frac{1}{2}$  of the people questioned prefer swimming.



These are the smallest sections on the chart.

This means that the climbing wall and squash are less popular activities than both swimming and the gym.


This section is  $\frac{1}{4}$  (25%) of the chart. This means that  $\frac{1}{4}$  of the people questioned prefer the gym.

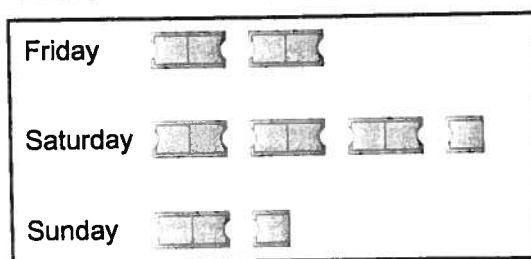
### Pictograms Use Pictures to Represent Numbers

- 1) Pictograms use pictures to show how many of something there are.
- 2) In a pictogram, each picture or symbol represents a certain number of items.

#### Example

The pictogram below shows the number of tickets sold at a cinema over 3 days.

 = 200 tickets sold



On Friday, 400 tickets ( $2 \times 200$ ) were sold.

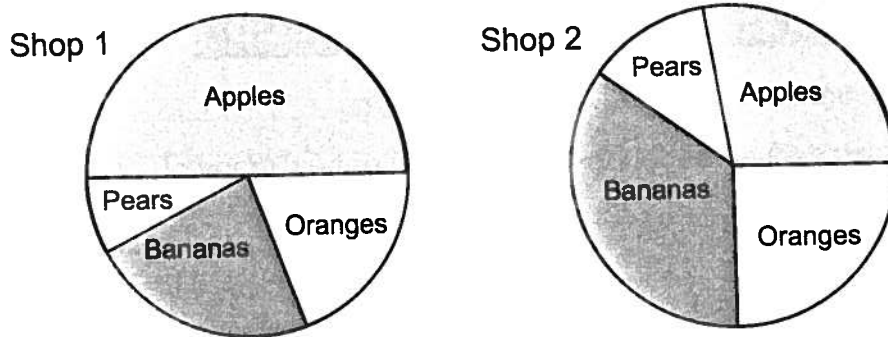
On Saturday, 700 tickets ( $3.5 \times 200$ ) were sold.

On Sunday, 300 tickets ( $1.5 \times 200$ ) were sold.

Total tickets sold =  $400 + 700 + 300 = 1400$  tickets.

## Practice Questions

- 1) A sales manager is looking at the sales of fruit in two different shops.



- a) In which shop are bananas the most popular fruit?

.....

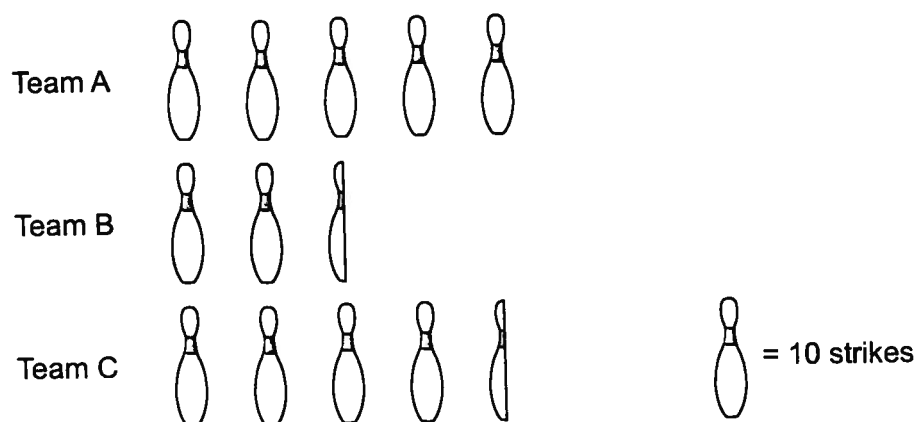
- b) In shop 1, what percentage of the fruit sold are apples?

.....

- c) In shop 2, what percentage of the fruit sold are oranges?

.....

- 2) The pictogram below shows the strikes scored by three bowling teams during a tournament.



- a) Calculate the number of strikes scored by each team.

i) Team A .....

ii) Team B .....

iii) Team C .....

- b) In total, how many strikes were scored by the three teams?

.....

# Drawing Charts and Graphs

## Drawing Bar Charts

You need to know how to draw a bar chart. The main steps are choosing what the axes will represent, choosing a scale for the axes and plotting (drawing) the data.

### Example

The table below shows the monthly sales of a newspaper over 6 months. Draw a bar chart to show this data.

Month	Newspaper sales (thousands)
January	25
February	23
March	24
April	20
May	22
June	26

- 1) The bar chart will need to show the months and the number of newspapers (in thousands) that were sold. So these are what the axes will represent.

- 2) Work out a scale for the axes. (This is how the units will be spaced out along each axis.)

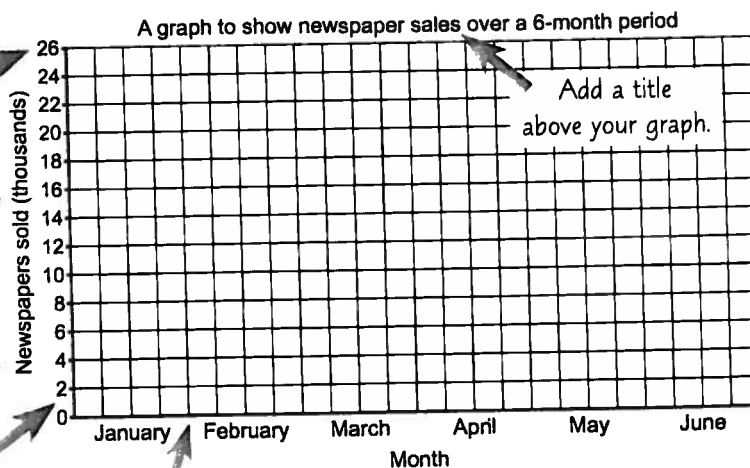
The biggest number of newspapers sold in a month is 26 000. So the axis needs to go from 0 to at least 26 000.

By giving the units as thousands you can just write, e.g. 26 on the scale.

Make sure the axes are clearly labelled.

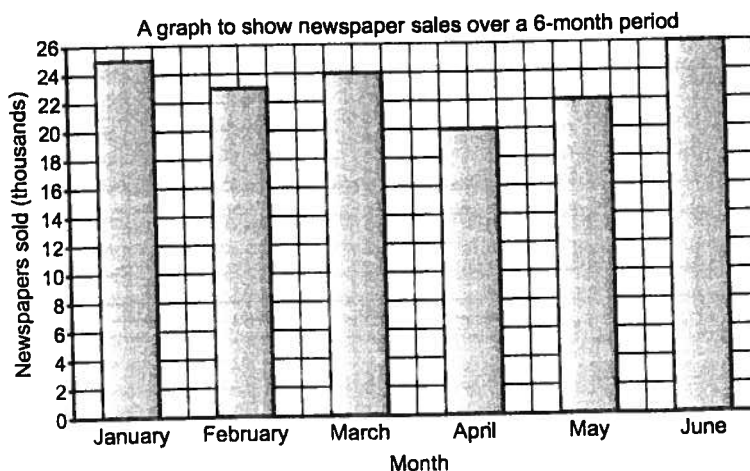
1 square = 2000 newspapers.

You need to pick a sensible scale for this axis. In this example, each bar will be 2 squares wide, with a 2 square gap between each bar.



- 3) Use a ruler to draw on the bars.

Make sure the bars are all the same width, and that the gaps between the bars are equal.



## Drawing Line Graphs

The main steps for drawing line graphs are choosing what the axes will represent, choosing a scale for the axes and plotting the points.

### Example

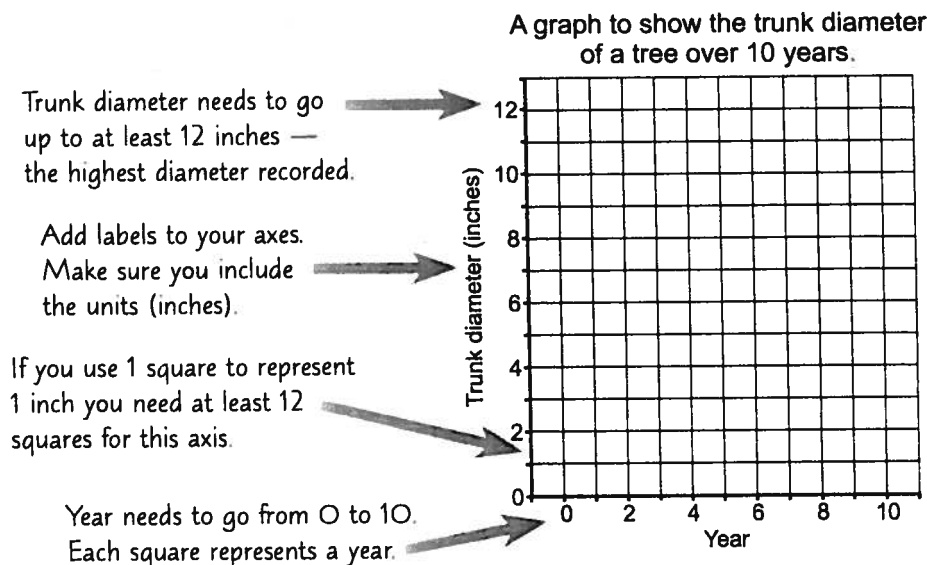
The growth of a tree over a period of 10 years is shown in the table. Show this data on a line graph.

- 1) The line graph will need to show the year and the trunk diameter.

So the diameter of the trunk and the year are what the two axes will represent.

Year	0	2	4	6	8	10
Trunk diameter (inches)	3	5	7	8.5	10.5	12

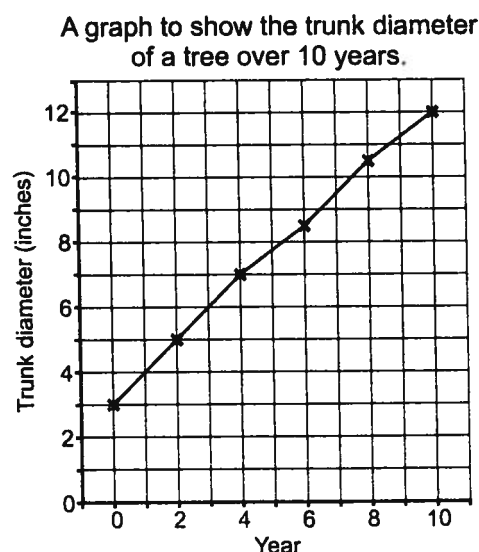
- 2) Work out the scales for the axes.



- 3) Now plot the points.

For example, by year 4 the trunk diameter was 7 inches. Put one finger on the year (4) and move it up until you reach the diameter of the trunk (7) — draw a cross here.

Once you've plotted the points, join them with straight lines.

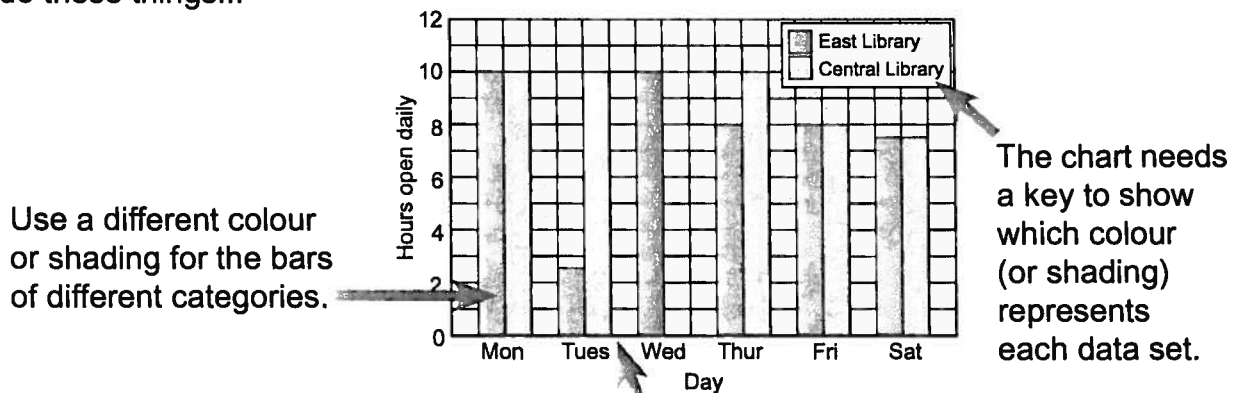


## Plotting Two Sets of Data

- 1) You may have to draw a chart or graph that shows more than one set of data.  
For example, a dual or composite bar chart or a line graph with more than one line.
- 2) You have to do all the same things that you would do when drawing a chart or graph for a single set of data, but there are a few extra things to think about too...

## Plotting Two Sets of Data on a Bar Chart

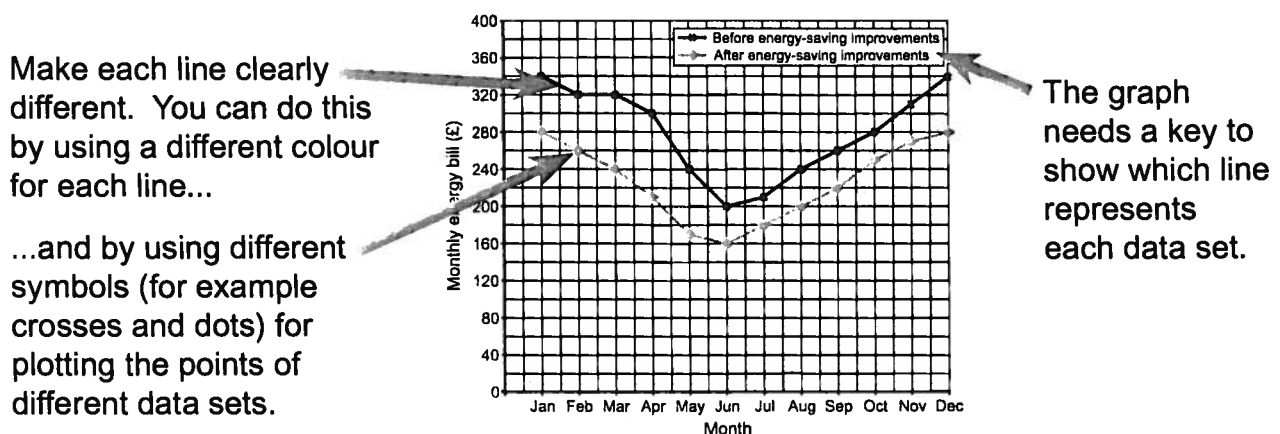
When you're drawing a bar chart with more than one set of data you need to remember to do these things...



Leave enough space on your horizontal axis for two bars at each data point if you're drawing a dual bar chart.

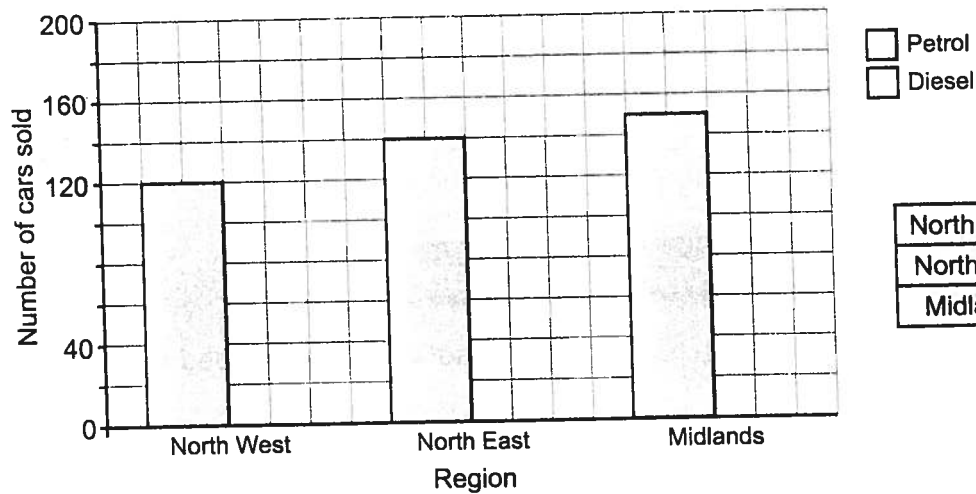
## Plotting Two Sets of Data on a Line Graph

When you're drawing a line graph with more than one set of data you need to remember to do these things...



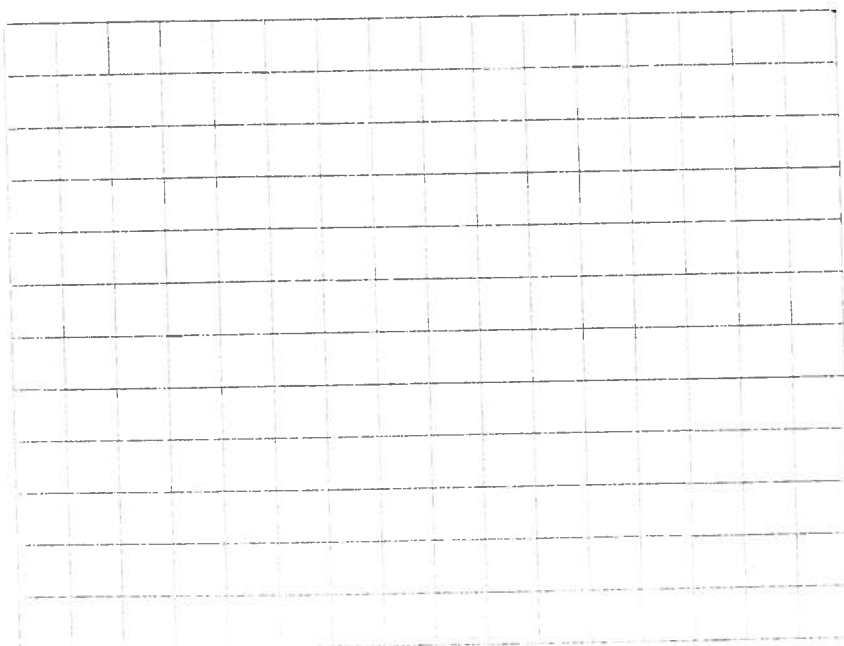
## Practice Questions

- 1) A company sells cars in different regions of the UK. The number of petrol and diesel cars it has sold over the past 6 months are shown in the unfinished dual bar chart below.



	Diesel
North West	150
North East	
Midlands	180

- a) How many petrol cars were sold in the North West?
- .....
- b) The sales of diesel cars in the North West and Midlands are shown in the table. Add these as bars to the chart.
- c) In the North East 20 more diesel cars than petrol cars were sold. Add a bar to show the sales of diesel cars.
- d) There is a number label missing from the vertical axis. Add this to the chart.
- 2) The amount of water left in the hot water tank of a house over the course of a day is shown in the table below. Draw a line graph to show how the amount of water changes.



Time	Hot water remaining (litres)
06:00	90
09:00	40
12:00	35
15:00	35
18:00	10



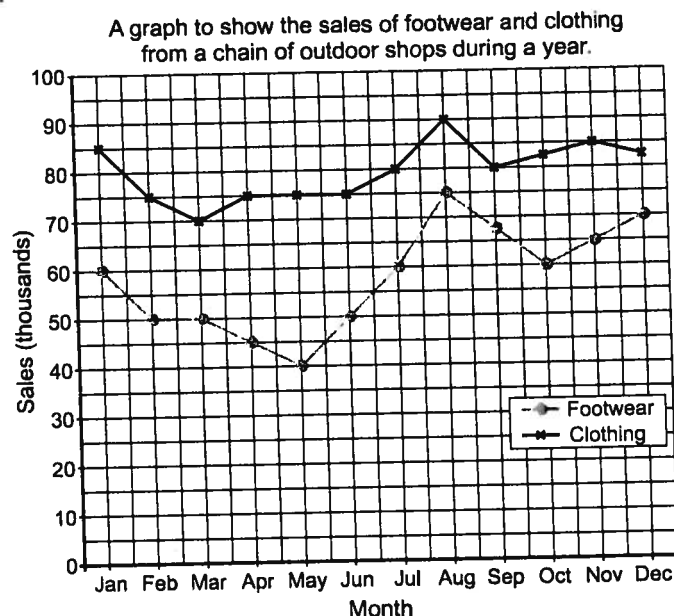
# Interpreting Data

## You Need to Be Able to Interpret Graphs

- 1) You can get a lot of information from looking at a graph.
- 2) As well as reading off specific measurements, you can look at the data as a whole and spot any trends (patterns). You can also compare different data sets.

### Example

The graph below shows sales of footwear and clothing from a group of outdoor shops.



From the graph you can see that:

- 1) Clothing sales are higher than footwear sales in every month of the year — the black line (clothing) is always higher than the blue line (footwear).
- 2) The sales of both clothing and footwear are highest in August — you can see this as the highest point on each line is in August.
- 3) There are differences in the sales of clothing and footwear during the year too. For example...

Footwear sales increase each month from October to December — the line slopes upwards from October to December.

But clothing sales don't change much during this time — the line slopes upwards slightly in November but goes back down to the same level as October in December.

## You Also Need to Be Able To Interpret Tables and Other Data

In the test you might have to look at some data and say what it shows.

### Example 1

Carl is a railway station manager. One of the trains that comes through the station is often delayed. The average lengths of the delay are shown below.

	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Average length of delay (minutes)	8	7.7	7.8	7	7	6.8	6.5

Carl says that the average length of the delay has been reduced by 20% in 6 months. Is he right?

- 1) In June, the average delay was 8 minutes. Six months later the average delay was 6.5 minutes. So the delay has been reduced by...

$$8 - 6.5 = 1.5 \text{ mins}$$

- 2) Work out what percentage of 8 minutes 1.5 minutes is...

$$\frac{1.5}{8} \times 100 = 18.75\%$$

- 3) So Carl is wrong — the average length of the delay has been reduced by 18.75%, not 20%.

### Example 2

The table below shows the sales of hot and cold drinks from a drinks stand at a range of average outdoor temperatures.

Average temperature (°C)	16.2	18.1	19.7	19.9	22	24.7
Number of hot drinks sold	21	20	19	17	13	12
Number of cold drinks sold	4	7	12	23	41	68

What can you say about the relationship between the average temperature and the number of hot and cold drinks sold?

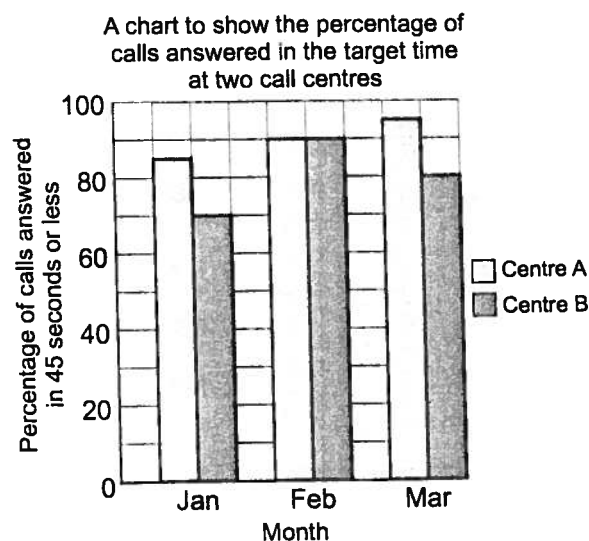
Answer:

The number of cold drinks sold increases as the average temperature increases. The number of hot drinks sold decreases as the average temperature increases.

## Practice Questions

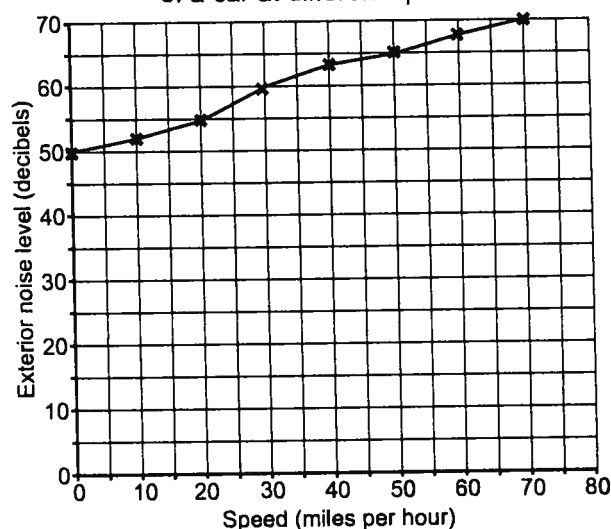
- 1) A company has two call centres. The target time for answering a phone call is 45 seconds. The bar chart shows the percentage of calls answered in the target time at each call centre.

Which of the call centres was more successful at answering calls in the target time?  
Explain your answer.



2)

A graph to show the exterior noise level of a car at different speeds



The graph on the left shows the exterior noise level of a car at different speeds.

Describe what the graph shows about exterior noise levels and speed.

- 3) The table below shows the number of hours 5 people work per week and their annual income.

	Helen	Joseph	Martha	Leo	Eugenia
Number of hours worked per week	37.5	32	36	10	26
Annual income (£)	27 500	17 500	13 500	8600	16 400

Write two statements to describe the information shown in the table

# Averages

## The Mean is a Type of Average

- 1) An average is a number that summarises a lot of data. For example, the average national salary is worked out from the salaries of everyone in the country.
- 2) The mean is one of several different types of average.

To work out the mean:

- 1) Add up all the numbers.
- 2) Divide the total by how many numbers there are.

### Example 1

The table shows the broadband speeds of a group of residents in a town. What is the mean broadband speed?

- 1) First, add up the numbers:  
 $6.7 + 13.6 + 7.9 + 12.2 + 17.1 = 57.5$
- 2) There are 5 numbers so divide the total by 5:  
 $57.5 \div 5 = 11.5$
- 3) The mean is 11.5 Mb.

Resident	Speed (Mb per second)
Mr Stewart	6.7
Mrs Fisher	13.6
Mr Ward	7.9
Mrs Ford	12.2
Mrs Wells	17.1

### Example 2

Martyn is moving house. He is trying to decide which of 3 houses he should buy. For work he travels between three different offices and would like to live in the house which has the lowest mean distance to all three of them. Use the information in the table to decide which house he should choose.

	Distance from office sites (miles)		
	House 1	House 2	House 3
North office	27	33	36
East office	33	6	21
West office	12	39	12

Work out the total distance each house is from all the offices then divide this by the number of offices (3).

House 1:	$27 + 33 + 12 = 72$	$72 \div 3 = 24$ miles
House 2:	$33 + 6 + 39 = 78$	$78 \div 3 = 26$ miles
House 3:	$36 + 21 + 12 = 69$	$69 \div 3 = 23$ miles

House 3 has the lowest mean distance from all the offices (23 miles), so Martyn should choose house 3.

Sometimes you already have the total and just need to divide it to get the mean.

### Example 3

The total weight of 15 containers on a freight train is 330 tonnes.  
On average, how much does each container weigh?

- 1) To find the mean weight of each container you need to divide the total weight by the number of containers.  
 $330 \text{ tonnes} \div 15 \text{ tonnes} = 22 \text{ tonnes}$
- 2) The mean weight of a container is 22 tonnes.

This doesn't mean that every container weighs 22 tonnes. Some might do, but others might weigh more or less — it's just an average.

## Estimating Using Means

- 1) You may be asked to estimate a total amount from a given mean.
- 2) To do this, multiply the mean by the number of items (for example) that you are given in the question.

### Example

Sheila makes wool jumpers. The jumpers take a mean time of 30 hours each to make. How long will it take her to make 5 jumpers?

To work out the total time you need to multiply the mean time by the number of jumpers.

$$30 \text{ hours} \times 5 = 150 \text{ hours}$$

## The Median is Another Type of Average

The median is the middle value of a set of data when the values are arranged in size order.

### Example

For the following data work out the median.

10, 6, 4, 7, 9, 2, 9, 3, 3, 7 and 9.

- 1) Firstly, arrange the data in order of size: 2, 3, 3, 4, 6, 7, 7, 9, 9, 9, 10
- 2) The median is the middle value, which is 7.

The easiest way to find this is to count in from each end of the arranged data until you have one number left.

## The Mode is Also a Type of Average

The mode is the most common value that appears in a set of data.

### Example

For the following data work out the mode.

10, 6, 4, 7, 9, 2, 9, 3, 3, 7 and 9.

- 1) Firstly, arrange the data in order of size: 2, 3, 3, 4, 6, 7, 7, 9, 9, 9, 10
- 2) The mode is 9 as it appears more than any other number (three times).

## Practice Questions

- 1) A small business records the amount of money customers spend on its website. The totals for the last 10 days are: £6750, £1225, £5643, £3633, £2600, £1512, £4570, £5080, £2287 and £4671. What is the mean amount spent online?  
.....  
.....
- 2) A group of 9 cars have a total weight of 16 920 kg. What is the mean weight of the cars?  
.....  
.....
- 3) Siobhan has been timing her journey to work for the past 7 days. The times she recorded are: 45 mins, 36 mins, 29 mins, 40 mins, 32 mins, 38 mins, 44 mins. What is Siobhan's median journey time?  
.....  
.....
- 4) At a factory Jonathan makes boxes. The number of boxes he can make in 10 minute periods has been counted. The numbers he made were: 8, 7, 8, 7, 6, 8, 6.
  - a) What is the mode number of boxes that Jonathan made every 10 minutes?  
.....
  - b) What is the median number of boxes that Jonathan made every 10 minutes?  
.....

# Range

## The Range is the Gap Between Biggest and Smallest

The range is the difference between the biggest value and the smallest value.

To work out the range:

- 1) Write down all the numbers in order from the smallest to the biggest.
- 2) Subtract the smallest number from the biggest number.

### Example

Babies are weighed when they are born. The weights of the babies born at a hospital this week in kilograms are: 2.2, 3.6, 2.6, 4.1, 4.0, 2.9, 2.4 and 3.2. Work out the range in the weight of newborn babies.

- 1) First, write the weights in order of size:  
2.2, 2.4, 2.6, 2.9, 3.2, 3.6, 4.0, 4.1.
- 2) Subtract the smallest number (2.2) from the biggest (4.1).

$$\text{Range} = 4.1 - 2.2 = 1.9 \text{ kilograms.}$$

## Practice Questions

- 1) Work out the ranges of the following sets of data.

- a) 3, 2, 6, 7, 11, 15, 8, 10.

.....

- b) 23.4, 36.5, 67.2, 22.2, 52.2, 43.7.

.....

- 2) Jeremy goes for a run every day after work for two weeks. He records the distance he covered each day in miles. They are: 2.2, 3.6, 2.9, 4.8, 4.6, 2.7, 5.2, 5.5, 4.3 and 3.7.

- a) What is the range of the distances that Jeremy ran?

.....

.....

- b) Jeremy recorded the last distance incorrectly. It should have been 4.7 miles rather than 3.7 miles. Would using the correct distance change the range?

.....

# Using Averages and Range

## Averages and Ranges can be Applied to Many Examples

You can use averages and ranges in real life examples.

### Example 1

The table below shows the practice lap times set by three racing drivers. Which driver has been setting the most consistent times?

Driver	Lap Times (seconds)				
	Lap 1	Lap 2	Lap 3	Lap 4	Lap 5
Smithson	54	52	53	55	51
Olivier	49	56	55	57	53
Durango	51	54	56	55	52

- 1) To answer this you can use the range of times the driver has set.

A small range of lap times for a driver means their times are all quite similar, so they are consistent. A large range means that the driver's times are not very consistent.

Smithson's range = 55 secs – 51 secs = 4 seconds

Olivier's range = 57 secs – 49 secs = 8 seconds

Durango's range = 56 secs – 51 secs = 5 seconds

- 2) So the most consistent driver is Smithson, who had the smallest range of times (4 seconds) across his practice laps.

### Example 2

Joe and Annette want to book a hotel. They have found some reviews online for two hotels (shown below). Each category has been scored out of 5.

		Review 1	Review 2	Review 3	Review 4	Review 5
Well Bridge Hotel	Location	4	4	3	3	3
	Service	4	3	3	3	4
	Rooms	4	3	2	3	3

		Review 1	Review 2	Review 3	Review 4	Review 5
Old Mill Hotel	Location	5	4	5	4	4
	Service	4	5	4	3	5
	Rooms	3	2	4	3	3

Which hotel has better reviews?



There is more than one way of answering this question but you need to use the information in the table to support any answers you give.

For example, you could work out the mean score for location, service and rooms for each hotel and then compare them.

	Mean Score		
	Location	Service	Rooms
Well Bridge Hotel	3.4	3.4	3
Old Mill Hotel	4.4	4.2	3

From these means, the Old Mill Hotel looks like it has better reviews.

### Practice Question

- 1) Jen wants to go on holiday with her husband.  
The table below shows prices from 4 different travel companies.

	Fly Well	City Hols	Destination City	City Escapes
3 days	£580	£597	£479	£560
4 days	£635	£675	—	£730

- a) What is the range and mean cost of a 3-day package from the 4 companies?

.....

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- b) Destination City don't offer 4-day packages.  
What is the range and mean cost of a 4-day package from the other 3 companies?

.....

.....

- c) Jen thinks that Fly Well offers cheaper holidays than City Escapes. Is she right?

.....

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# Probability

## Probability is all About Likelihood and Chance

1) Likelihood is how likely an event is to happen.

2) There are some key words you need to know:

- **Certain** — this is when something will definitely happen.  
For example, getting a number between 1 and 6 when you roll a dice.
- **Likely** — this is when something isn't certain, but there's a high chance it will happen. For example, it's likely that it will rain during the summer in the UK.
- **Even chance** — this is when something is as likely to happen as it is not to happen. For example, there's an even chance of getting heads when you toss a coin.
- **Unlikely** — this is when something isn't impossible, but it probably won't happen. For example, it's unlikely you'll win the jackpot in the lottery.
- **Impossible** — this is when there's no chance at all of something happening. For example, it's impossible to roll a 7 on a standard six-sided dice.

3) An event being impossible isn't the same as one that is very very unlikely. For example, it's very very unlikely that it won't rain in the UK in winter, but it's not impossible.

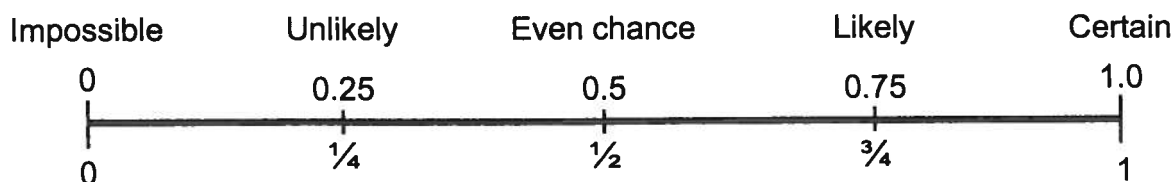
## Numbers can be Used to Describe Probability

Fractions, decimals and percentages can all be used to describe probability.

- If something is impossible, it has a probability of 0 (or 0%).
- If something has an even chance of happening, it has a probability of 0.5 (or  $\frac{1}{2}$  or 50%).
- If something is certain, it has a probability of 1.0 (or 100%).
- If something is likely, the probability of it happening is between 0.5 and 1.  
The more likely it is, the closer it will be to 1.
- If something is unlikely, the probability of it happening is between 0.5 and 0.  
The less likely it is, the closer it will be to 0.

## Probability can be Shown on a Scale

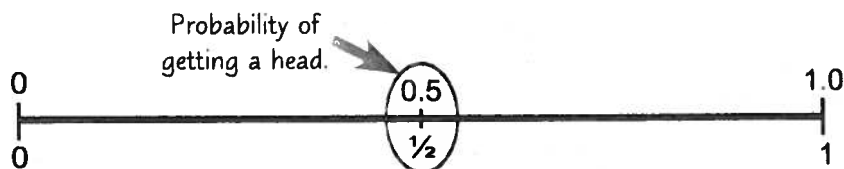
The probability of something can be shown on a scale between 0 and 1 — see below.



### Example

What is the probability of getting a head when tossing a coin?

There is an even chance of getting a head or a tail so the probability is  $\frac{1}{2}$  (or 0.5 or 50%). This can be shown on a probability scale:



In the scale above both the decimals and fractions are shown, but in the test you would only need to show one of them.

## You May Need to Calculate a Probability

Sometimes you'll need to work out the probability of something happening.

### Example 1

Sam is a hockey club coach. He divides the team of 16 players by asking each player to draw a ticket at random from a hat. The hat contains 4 blue, 4 green, 4 red and 4 yellow tickets. What is the probability of the first player to pick getting a blue ticket?

There are 16 tickets in total and 4 blue tickets so the probability is  $\frac{4}{16}$  or more simply  $\frac{1}{4}$

You can also give the probability as a percentage (25%) or a decimal (0.25).

### Example 2

Mohini has brought a box of apples into work to share with her colleagues. There are 5 green apples and 9 red apples. What is the probability of picking a red apple out of the box at random?

There are 14 apples in total and 9 red

apples so the probability is  $\frac{9}{14}$

← You need to give this probability as a fraction because it doesn't give an exact decimal.

**Practice Questions**

- 1) James thinks it's impossible to have warm and sunny weather in the UK during December. Is he right? Explain your answer.  
.....  
.....
- 2) Sophia has a pack of buttons containing 4 blue, 6 pink, 8 white and 6 red buttons. She picks one out without looking. What is the probability of Sophia picking a red button?  
.....
- 3) Simon has baked 90 pies. 30 are cheese and onion, 30 are meat and potato and the others are steak and stilton. They are all mixed up on a tray. If he picks one at random what is the probability it will be a steak and stilton pie?  
.....
- 4) A travel company has a fleet of 16 coaches. 12 are painted black and 4 are painted white. At the start of the day all the coaches are available and Geoff picks up a set of coach keys.
  - a) What is the probability he has the keys to a white coach?

## Test Help

### Always Show Your Working

- 1) In the test it's really important that you show all of your working — there are lots of marks for the methods you use and the calculations that you do.
- 2) If you don't show how you worked your answer out, you may not get all of the marks — even if your final answer is right.
- 3) So, even if you type a calculation into your calculator to work it out, you must write the calculation down for the examiner to see as well.

### You May Have to Use an Answer in Another Calculation

- 1) Sometimes you may need to use the answer to one question to work out the answer to another question.
- 2) If you get the answer to the first question wrong, you'll also get the answer to the second one wrong.
- 3) BUT if you use the right method, and you use the answer that you got for the first question in your calculation, then you can still get full marks for the second question.
- 4) So even if you're unsure about an answer, don't give up — make sure you keep going until the end of the question.

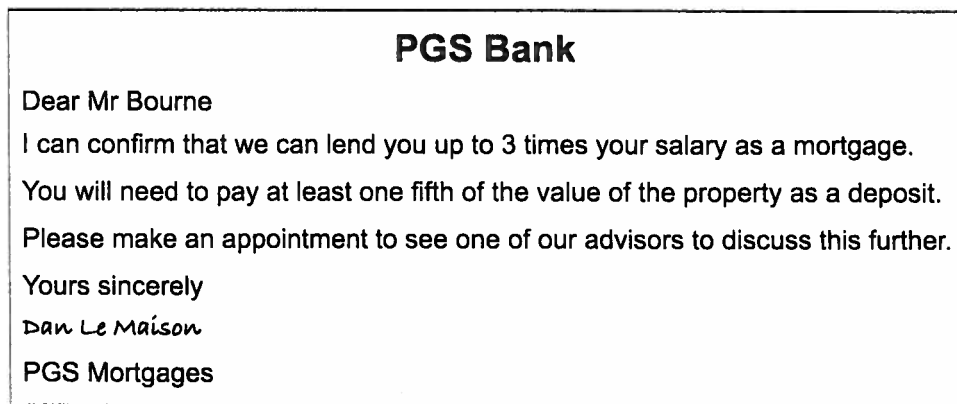
### Always Check Your Answers

It's really important that you check your answers. Checking your answers helps you to spot mistakes that you've made, and in some questions there are marks for showing that you've checked your answer. There are lots of ways you can check answers. For example...

- 1) Reverse the calculation (see pages 2 and 3 for more on this).
- 2) Do the calculation again using a different method to see if you get the same answer.
- 3) Think about whether your answer is sensible. For example, if you're working out the cost of someone's lunch and your answer comes out as hundreds of pounds then you've probably made a mistake somewhere.

## Task 1 — Banking and Finance

1. Sean earns £23 500 per year, and has £10 000 saved up for a deposit on a new flat. Sean has seen a flat for sale for £55 000. He has received a letter from his bank about taking out a mortgage.



- a) Can he buy the flat under the conditions given by PGS in the letter above?

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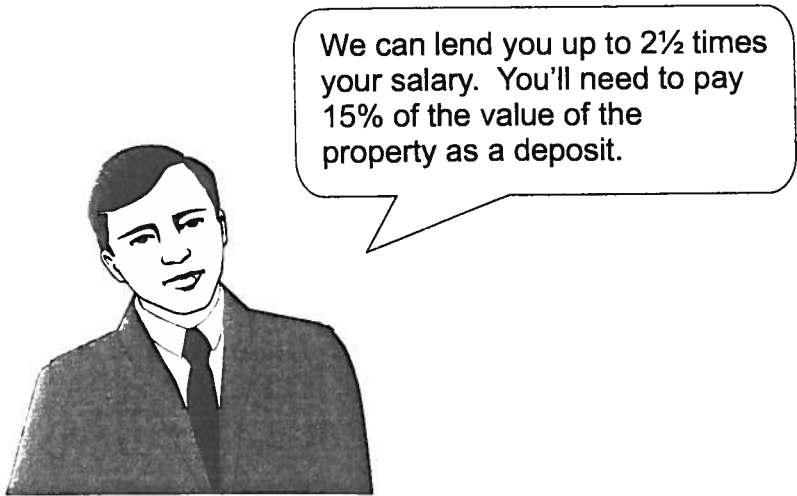
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(3 marks)

b) Sean decides to talk to another bank about their mortgage deals.



Can he buy the flat with a mortgage from this new bank?

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(3 marks)

2. Danni is starting a new job as an outdoors instructor. She will be paid £16 000 a year. She wants to work out how much tax she will have to pay.

**Working out your Income Tax — A Helpful Guide**

**If you earn up to £35 000:**

You will not be taxed on the first £7475.

You will be taxed 20% on the rest of your money.

**If you earn between £35 001 and £150 000:**

You will not be taxed on the first £7475.

You will be taxed 20% on any amount between £7476 and £35 000.

You will be taxed 40% on the rest of your money.

**If you earn over £150 000:**

You will not be taxed on the first £7475.

You will be taxed 20% on any amount between £7476 and £35 000.

You will be taxed 40% on any amount between £35 001 to £150 000.

You will be taxed 50% on the rest of your money.

- a) Using the guide above, how much income tax will Danni have to pay each year?

.....

.....

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(2 marks)



- b) Just before Danni starts work, the rules for paying income tax change.  
A new guide to working out your income tax is published.

**NEW: Working out your Income Tax — A Helpful Guide**

**If you earn up to £34 370:**

You will not be taxed on the first £8105.

You will be taxed 20% on the rest of your money.

**If you earn between £34 371 and £150 000:**

You will not be taxed on the first £8105.

You will be taxed 20% on any amount between £8106 and £34 371.

You will be taxed 40% on the rest of your money.

**If you earn over £150 000:**

You will not be taxed on the first £8105.

You will be taxed 20% on any amount between £8106 and £34 371.

You will be taxed 40% on any amount between £34 371 to £150 000.

You will be taxed 50% on the rest of your money.

Under these new rules, how much less income tax will Danni have to pay each year?

.....

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(3 marks)

3. Emily takes out a loan to buy a car for £6750.  
She wants to pay it back in full, including the interest, in 12 equal monthly instalments.

Annual interest rates for loans

Amount Borrowed	Interest Rate
less than £5000	17%
£5000 - £10 000	15%
more than £10 000	13%

Repayment calculations:  
Monthly repayments are calculated by adding the interest amount to the amount borrowed and splitting the total into equal monthly repayments.

How much will Emily have to pay each month, to the nearest penny?

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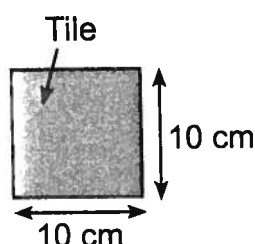
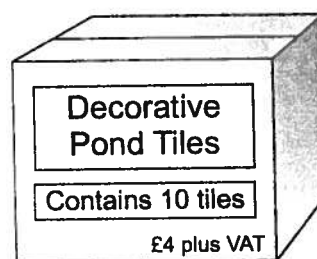
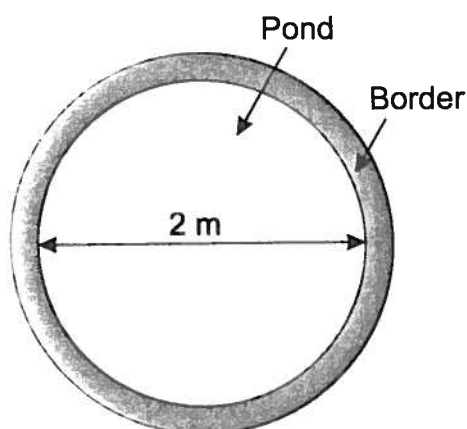
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(3 marks)

## Task 2 — Landscape Gardening

4. Harry is building a pond in his garden.  
He wants to put a border made of tiles around the pond.



Perimeter of a circle (in m) =  $\pi \times \text{diameter (in m)}$   
You may use  $\pi = 3.14$ . VAT = 20%

- a) How many boxes of tiles will Harry need to buy to go all the way around the pond?

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(5 marks)

b) How much will the tiles cost Harry in total?

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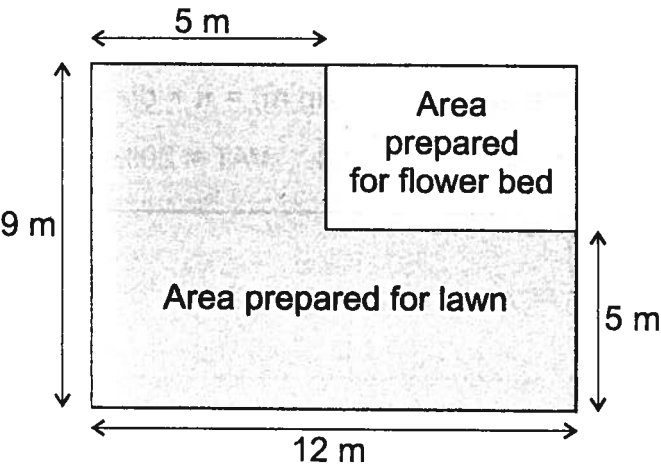
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(2 marks)

5. Jordan is redesigning his garden. He wants to have a lawn and one large flower bed. He will need to order turf for his lawn. A plan of Jordan's garden is shown below.



Turf Shack	
We sell turf by the roll, and deliver <u>anywhere</u> in the UK!	
Price per roll:	£4.75
(2 m × 2 m)	
<u>Delivery Charges:</u>	
Under 10 rolls:	£9.25
10-20 rolls:	£14.25
Over 20 rolls:	£19.25

a) What area of turf will Jordan need to order for his lawn?

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(4 marks)

b) How much will it cost Jordan to turf the lawn if he has the rolls delivered?

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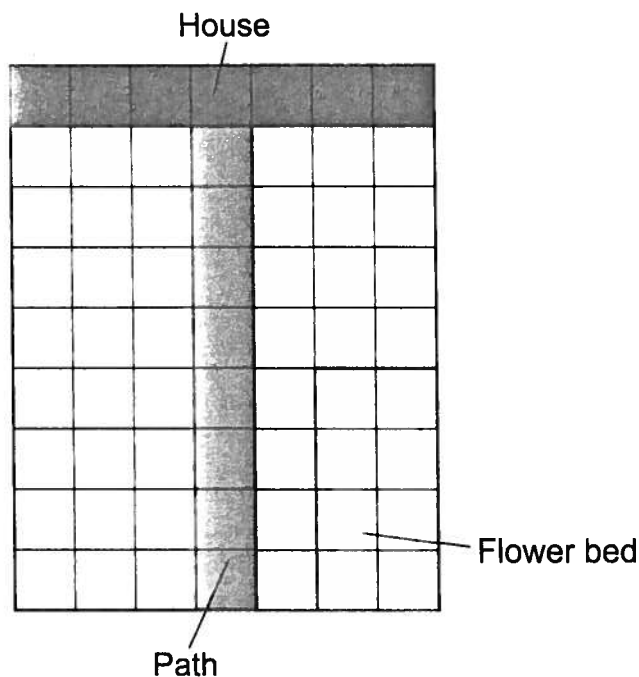
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(4 marks)

6. Sunita is redesigning her garden and has drawn up a plan of it.



Key: Side of 1 square on the plan = 200 cm in the garden.

- a) How wide is Sunita's garden in metres?

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 .....  
 (2 marks)

- b) Sunita wants to put a  $4\text{ m} \times 4\text{ m}$  summer house in the garden.
- The summer house must be at least 4 m from the house.
  - It can't be built on the path or the flower bed.

Choose a place to put the summer house and draw the summer house to scale on the plan.

(2 marks)

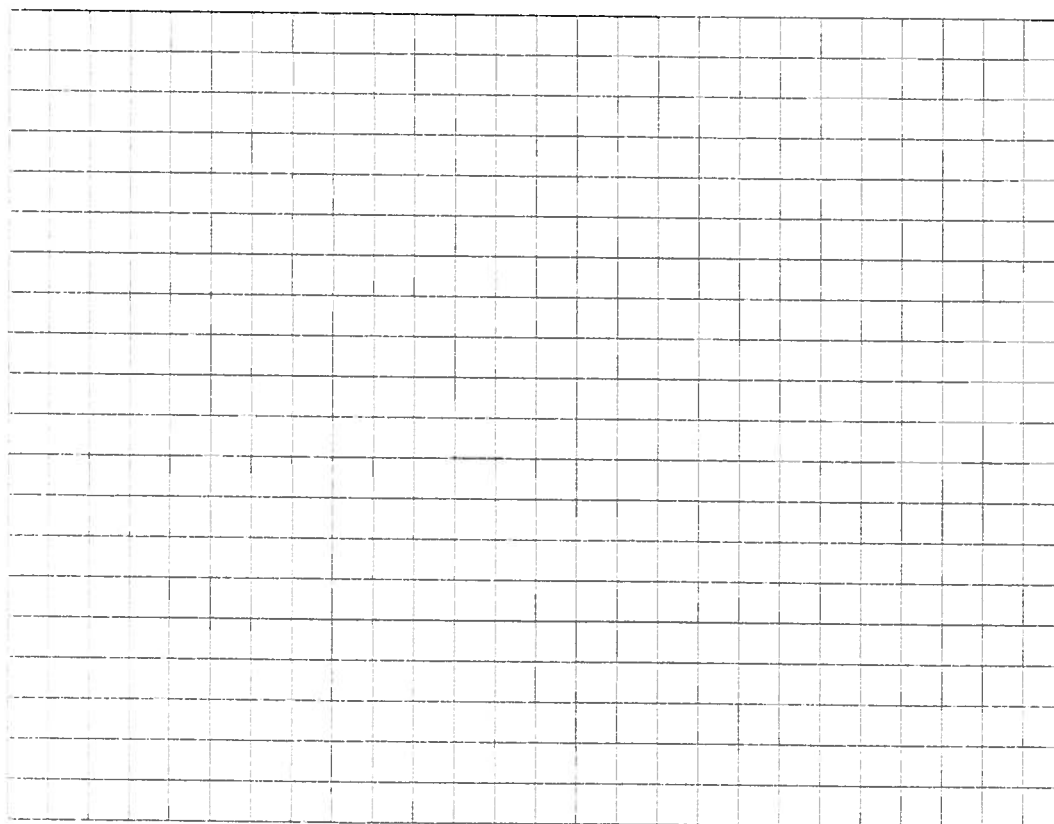
## Task 3 — Health and Fitness

7. Jane is making a display board for Local Leisure Ltd.

She has collected information from members on how much they exercise and their Body Mass Index (BMI). The information is shown in the table below.

<b>Hours of exercise per week</b>	10	9	8	7	12	8	6	9	9	8
<b>BMI</b>	20	21	23	25	16	24	28	22	23	25

- a) Using the information in the table, draw a graph or chart of BMI against number of hours of exercise on the grid below.



(3 marks)

- b) Using the information in your graph or chart, make one statement about the relationship between BMI and time spent exercising.

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(1 mark)

8. Jane wants to work out her own BMI. She uses the following formula:

$$\text{BMI} = \frac{M}{(H^2)}$$

where M = body mass in kg  
and H = height in m

a) Jane’s body mass is 55 kg. She is 1.6 m tall. What is her BMI?

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(2 marks)

b) Jane’s friend has a BMI of 25.5. She is 1.55 m tall. What is her body mass?  
Show a check of your calculation.

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(4 marks)

The table below can be used as a guide to determine whether someone is underweight, normal weight, overweight or obese.

BMI	Weight Description
below 18.5	underweight
18.5 - 24.9	normal
25 - 29.9	overweight
30 - 40	moderately obese
above 40	severely obese

c) What weight description categories do Jane and her friend fall into?

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(2 marks)



## Task 4 — Going Out

9. Mia and Deanne are planning a day in town.  
 They want to see a fashion show at Bedhams and go to the 'Quick Flash Sale!'  
 They also want to see 'Snow Age' at the cinema.  
 The cinema is 1 mile away from Bedhams. They can walk at about 3 miles per hour.

Bedhams Department Store	Cinema Film Times
Fashion Show: 10.00 – 11.00	Snow Age: 11.10 – 13.10
12.30 – 13.30	11.30 – 13.30
<i>Quick Flash Sale!</i> starts at 15.30	14.00 – 16.00
	14.30 – 16.30

- a) Draw up a timetable for the girls' day in the space below.

(3 marks)

- b) The girls want to have lunch at Bedhams before the Quick Flash Sale.  
 How much time will they have? Explain your answer.

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(1 mark)

10. Hannah and Wayne are going to watch the film 'On the Ghost Trail' at the cinema on Minsterbury High Street. They want to catch the bus from Nauton Green.

Film Times:

On the Ghost Trail (160 mins\*)  
Starts: 6 pm

Shakespeare's Lovers (150 mins\*)  
Starts: 7.15 pm

In the Ghetto (125 mins\*)  
Starts: 9.45 pm

\*Plus approx. 20 mins of trailers  
at start of the screening.

Hastwick	1605	1705	1805	Minsterbury Bus Station	1915	2015	2115*
Nauton Green	1635	1735	1835	Minsterbury High St.	1925	2025	2125
Minsterbury Castle St.	1650	1750	1850	Minsterbury Castle St.	1930	2030	2130
Minsterbury High St.	1655	1755	1855	Nauton Green	1945	2045	2145
Minsterbury Bus Station	1705	1805	1905	Hastwick	2015	2105	2205

\*Last Bus

- a) It takes 10 minutes to walk to the bus stop in Nauton Green. What is the latest time Hannah and Wayne can set off to get to the cinema on time? Explain your answer.

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(2 marks)

- b) Hannah is worried that they will miss the last bus home after the film. Will they be in time to catch it?

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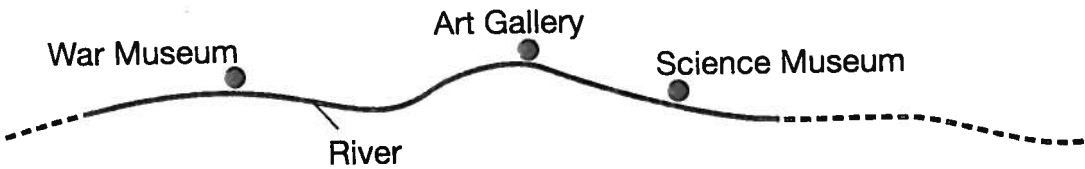
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(3 marks)

11. Betty wants to visit the War Museum, Art Gallery and Science Museum.  
Her friend will drop her off and pick her up from the War Museum,  
and she will travel between each place by boat.



Map scale: 1 cm = 1.5 km

**BOAT PRICES**

Between:	Single:	Return:
War Museum and Art Gallery	£3.75	£7
Art Gallery and Science Museum	£2.20	£4
Science Museum and War Museum	£4.50	£8

**ENTRY PRICES**

War Museum — £4.50
Art Gallery — free
Science Museum — £5.90

- a) If Betty buys her boat tickets in the cheapest way possible, what will be the total cost of her day trip?

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(3 marks)

- b) How far is the boat journey between the Art Gallery and the Science Museum? Give your answer in miles. Distance in miles = distance in km  $\times$  0.6.

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(3 marks)

## Task 5 — Decorating

12. Teresa is painting her living room. She wants to know how much paint to buy.



1 litre of paint covers  $12 \text{ m}^2$  with one coat.

Room measurements:

4 walls, each wall is 4 m by 3 m.

The room has 1 door, which is 1 m by 2 m,  
and 2 windows, which are both 1 m by 2 m.

How many tins should Teresa buy to paint the room with three coats?

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(3 marks)

13. James is painting his kitchen light blue.  
He needs to mix dark blue paint with white paint to make the right colour.  
The paint should be mixed with a ratio of 1:2, blue:white.  
The area to be painted is 36 m<sup>2</sup>. 0.5 litres of paint will cover 1 square metre of wall.  
The tins of paint hold 2 litres each.

How many tins of white paint will James need?

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(3 marks)

14. Sandeep is tiling his bathroom. He works out that he will need to put up 80 tiles in total. He starts tiling at 1 pm.

- a) Sandeep puts up 30 tiles by 3 pm. If he continues to work at this pace, can he finish tiling the bathroom by 6 pm? Explain your answer.

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*(3 marks)*

- b) Sandeep also needs to tile his shower room. He wants to create a symmetrical pattern, using three different tiles:



The pattern will be 6 tiles wide and 4 tiles long. Sandeep wants to use equal numbers of each tile. He doesn't want any gaps between the tiles.

On the grid below, draw a symmetrical pattern that Sandeep could use.



*(3 marks)*



## Task 6 — A Car Boot Sale

- 15.a) Dave is selling CDs, DVDs, books and comics at a car boot sale. He sells CDs for 50p, DVDs for £1, books for 30p and comics for 20p. Dave wants to make a table to keep track of how many of each item he has sold as he goes along. He also wants to be able to record the amount of money he has made at the end of the day.

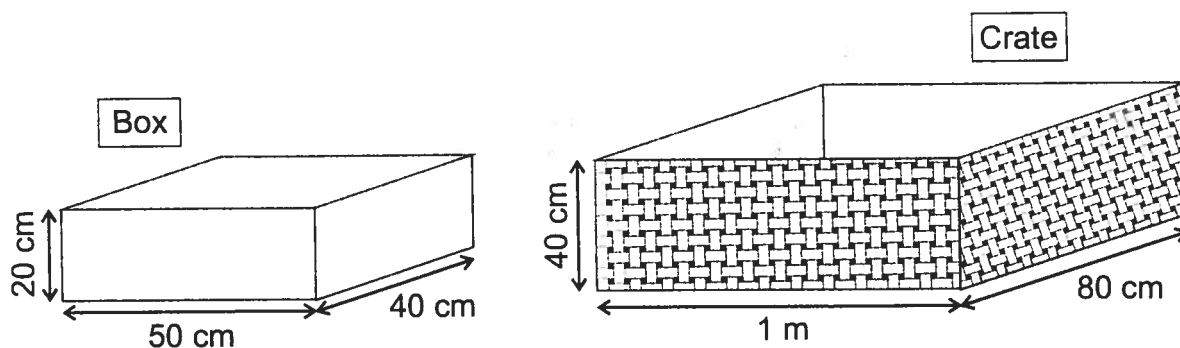
Draw a table that Dave could use.

The table must have room to record:

- the items being sold (books, CDs, DVDs and comics)
- the price of each item
- the number of each item sold
- the amount of money he has made from each of CDs, books, DVDs and comics
- the total amount of money he has made

*(4 marks)*

- b) Chris is running a stall at the car boot sale. He packs some of the items he wants to sell into boxes, shown below. These boxes are then packed into crates.



- i) How many boxes will Chris be able to fit into each crate?

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(3 marks)

- ii) Chris has run out of boxes and needs to make some more. Draw a net that Chris could use to make the box shown above. Write the dimensions on the net.

(2 marks)

- c) Jess has made 15 bead necklaces to sell at the car boot sale.  
The receipts for the materials she bought to make the necklaces are shown below:

necklace clasps	£11.25
thin leather cord	£3.80
Total	£15.05

Glass beads (large)	— £9.65
Glass beads (small)	— £6.10
Total	<u>— £15.75</u>

large red beads	£4.00
small blue beads	£1.60
small red beads	£1.60
painted beads	£2.50
Total	£9.70

Jess wants to make a 20% profit. What price will she need to sell each necklace for?

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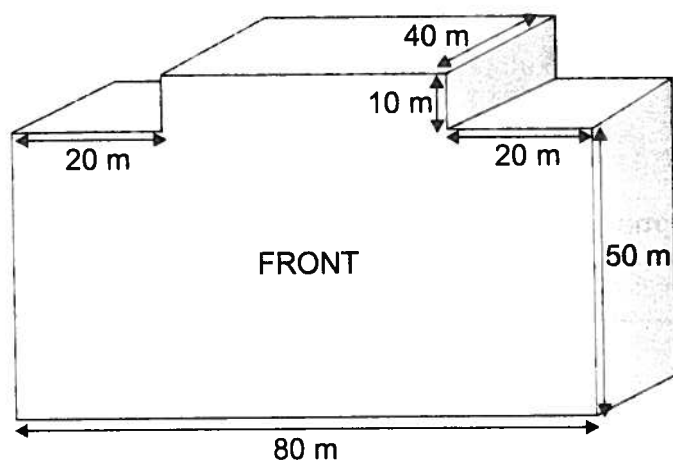
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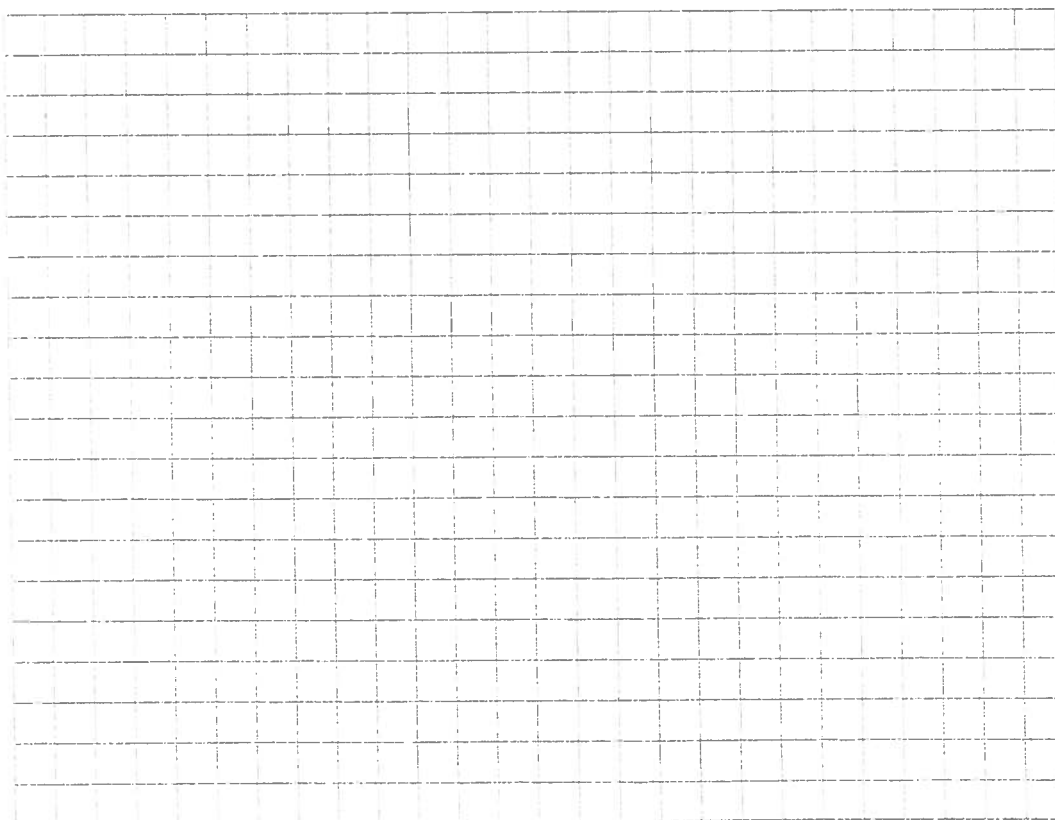
(3 marks)

## Task 7 — City Planning

- 16.a) Craig is designing an office building. A sketch of one of Craig's ideas is shown below.



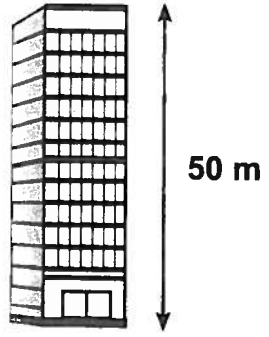
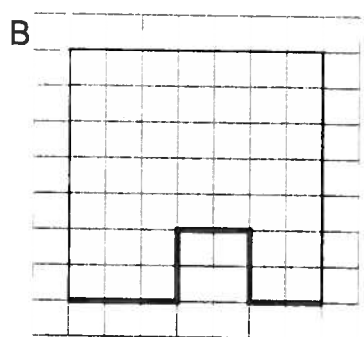
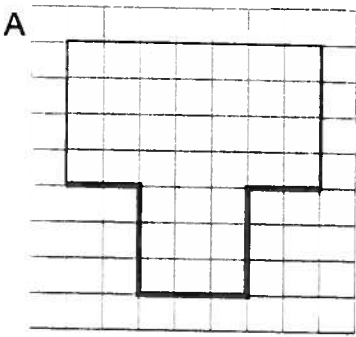
- i) Craig needs accurate plans of the building to show to the town planners.  
Draw a side view of the building above on the grid provided below.  
You must clearly label the building's dimensions.



Key: Side of 1 square on the grid is 10 m on the building.

(2 marks)

ii) Craig has drawn plan views of two more of his ideas, shown below. These show the buildings from above.



Front walls = — = 1 m<sup>2</sup>

Height of building: 50 m

Reinforced, toughened glass: £100 per m<sup>2</sup>

The front walls of the building will be made from glass.  
How much extra would it cost to make the front walls of Building A compared to Building B?

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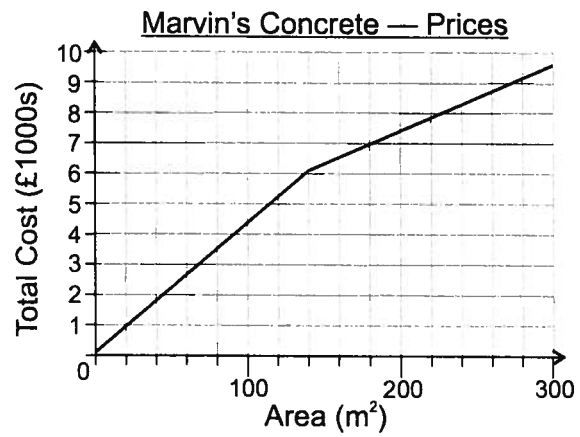
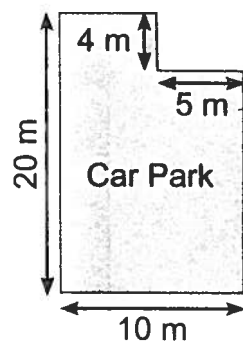
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(5 marks)

- b) A local council is resurfacing a car park with concrete.



What will the total cost of the concrete be?

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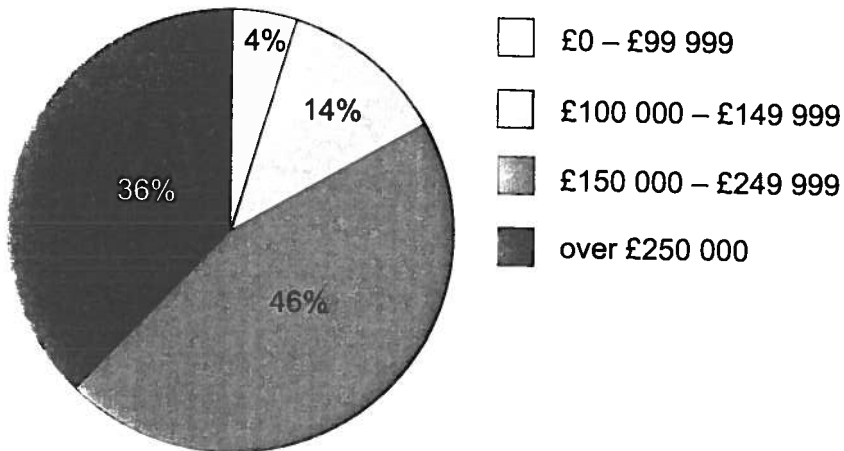
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(3 marks)

- c) A housing committee are responsible for making sure there are enough 'low-cost' houses in a town.

Their annual report shows their targets and their results.

Price of houses built in 2012



Committee Targets

2012 target: 25% of new houses must be 'low-cost'.

'Low-cost' houses are houses that cost less than £150 000.

- i) 3600 new houses were built in 2012.  
How many more low-cost houses should have been built to meet the target?

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(3 marks)

- ii) 4200 new houses are going to be built next year.  
8 out of 10 of these will cost over £150 000 to buy.  
What percentage will be low-cost houses?

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(2 marks)



## Task 8 — A Christmas Fair

17. Colin has made a game for a Christmas fair. In a bag, he has 3 red balls, 5 green balls and 7 black balls. If you pick a red ball, you win a prize.

a) i) If 140 people play Colin's game, how many people are likely to win?

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(2 marks)

- ii) Colin wants to record the colour of ball picked each time the game is played. Draw a table that Colin could use to do this.

(2 marks)

- b) Adil has arranged a mini sports tournament for the fair. He splits people into three teams and they play three games. The scoring system is:
- 10 points for winning
  - 5 points for second place
  - 2 points for last place

i) The table below shows the results for Game 1.

In Game 2, Team 2 won, Team 1 came second and Team 3 came last.  
In Game 3, Team 1 won, with Team 2 coming second and Team 3 last.

Use these scores to complete the table.

	Game 1	Game 2	Game 3	Total
Team 1	5			
Team 2	2			
Team 3	10			

(3 marks)

ii) The team with the most points won the tournament.

Adil says that the team that won had both the highest mean score and the highest modal score. Is he correct? Explain your answer.

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(3 marks)

- c) Yvonne is running a competition called 'Guess the Weight of the Sweets in the Jar'. The table below shows the first five guesses.

	Weight Guessed
Nick	3 lbs
Leila	1.6 kg
Carys	2.2 lbs
Evan	2500 g
Paul	32 oz

$$1 \text{ kg} = 2.2 \text{ lbs}$$

$$1 \text{ lb} = 16 \text{ oz}$$

The jar weighs 1.54 kg.

Of the people in the table, who came closest to guessing the correct weight?

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(6 marks)

# Answers — Practice Questions

## Section One — Number

### Page 2

Q1 14 034

Q2 154

To check:  $154 + 96 = 250$ 

Q3 £59

Q4 Yes. He has 15 days' holiday left.

### Page 4

Q1 250 g

Q2 £0.32 or 32p

To check:  $0.32 \times 100 = 32$ 

Q3 a) £24

b) £84

### Page 5

Q1 a) 289

b) 1936

Q2 3

Q3 4

### Page 7

Q1 2

Q2 22

Q3 17

Q4 105 miles

### Page 9

Q1 Jess

Q2 a) Rachael

b) -£331

Q3 12 °C

### Page 10

Q1 -3 °C

Q2 1 °C

### Page 11

Q1 a)  $\frac{9}{13}$ b)  $\frac{4}{13}$ 

### Page 12

Q1 12

Q2 10

Q3 a) 4

b) 8

### Page 13

Q1 £20

Q2 360 g

Q3 £1000

### Page 15

Q1 18.75 or 18¾

Q2 4.75

Q3 It's quicker to change at Lancaster. This journey only takes 2.25 hours (2¼) compared to 2.5 (2½) hours.

### Page 19

Q1 3.6

Q2 1.02

Q3 1.05 km, 1.2 km, 1.25 km, 1.75 km

Q4 No. She only has 43.8 points.

Q5 £238.32

Q6 18.75 hours or 18¾ hours

Q7 £0.80 or 80p

Q8 £7.89

### Page 21

Q1 7.68

Q2 264

Q3 9

Q4 21

Q5 £14 700

### Page 22

Q1 £72

Q2 £21 420

Q3 £36 750

Q4 455

### Page 24

Q1 a) 0.75

b)  $\frac{1}{2}$ 

Q2 a) 80%

b) 0.8

Q3 0.75 (¾ or 75% would also be correct).

Q4 20%

### Page 25

Q1  $\frac{6}{15}$ 

Q2 A third off line rental. It saves you £4.20 a month compared to £3.25 a month for 25% off broadband.

### Page 26

Q1 a) 15 out of 60 OR  $\frac{15}{60}$ (you could also put e.g.  $\frac{5}{20}$  or  $\frac{1}{4}$ )b) 25 out of 60 OR  $\frac{25}{60}$ (you could also put  $\frac{5}{12}$ )Q2 18 out of 27 OR  $\frac{18}{27}$ (you could also put e.g.  $\frac{6}{9}$  or  $\frac{2}{3}$ )Q3 4 out of 20 OR  $\frac{4}{20}$ (you could also put e.g.  $\frac{2}{10}$  or  $\frac{1}{5}$ )

### Page 29

Q1 300 ml

Q2 a) 48

b) 72

Q3 300 g

Q4 2 litres

Q5 300

### Page 31

Q1 750 g

Q2 187.5 ml

Q3 88.2 minutes or 88 minutes and 12 seconds or 1 hour 28 minutes and 12 seconds.

Q4 7 cards completed

### Page 33

Q1 £40

Q2 £70

Q3 £67.50

Q4 £33 (£20 before midnight, plus £13 after midnight)

Q5 £68

### Page 36

Q1 a) 7

b) 14

Q2 4

Q3 £320

### Page 38

Q1 6 kilometres

Q2 60 cm

## Section Two — Measure

### Page 42

- Q1 7500 m  
Q2 6.4 kg  
Q3 0.56 L  
Q4 33 lbs  
Q5 6.2 miles  
Q6 £300  
Q7 a) 0.2 L  
b) 200 ml  
Q8 190.5 cm

### Page 45

- Q1 a) 26 cm  
b) 108 mm  
Q2 a) 3.6 cm  
b) 1.8 cm  
c) the circumference  
Q3 a) 4.9 m  
b) 8.5 m  
c) 31.4 m

If you got the wrong answer for part a) and b), you'll have got a different answer to part c).

- Q4 37 cm

### Page 48

- Q1 9 strips.  
Q2 105 squares of turf.  
Q3 70 desks

If you start with desks right against a side wall, you can fit 7 desks in a row across the hall. If you start with desks right up against the front wall of the hall, you can fit ten rows going the length of the hall.  $7 \times 10 = 70$  desks. If you left a gap at the front or side of the hall you'll have a slightly different answer.

### Page 50

- Q1 a) 4 cm<sup>2</sup>  
b) 11.77 m<sup>2</sup>  
Q2 525 cm<sup>2</sup>  
Q3 0.81 m<sup>2</sup>  
Q4 a) 36.76 cm<sup>2</sup>  
b) 108 cm<sup>2</sup>

### Page 52

- Q1 10.8 cm<sup>2</sup>  
Q2 3848.45... mm<sup>2</sup> (or 3846.5 mm<sup>2</sup> if you used 3.14 for  $\pi$ )

### Page 55

- Q1 85 cm<sup>2</sup>  
Q2 £214.50

To answer this question you need to start by working out the total area of floor =  $(7 \times 3) + (6 \times 2) = 33$  m<sup>2</sup>. Then work out the amount of concrete you need by multiplying this area by the amount of concrete per m<sup>2</sup>. This is  $33 \text{ m}^2 \times 0.1 = 3.3 \text{ m}^3$ . The cost of this concrete is  $3.3 \text{ m}^3 \times £65 = £214.50$ .

### Page 57

- Q1 a) 9000 cm<sup>3</sup>  
b) 70 000 mm<sup>3</sup>  
Q2 0.168 m<sup>3</sup> or 168 000 cm<sup>3</sup>  
Q3 1 bag

### Page 60

- Q1 a) 1642p  
b) £2.10  
Q2 The 12 pack is the best value for money. (£0.52 per can. The price per can of the 6 pack is £0.53.)  
Q3 Michelle as the 14 g jar is the best value. (It costs 6.79p per gram. The 7 g jar costs 8.57p per gram.)

### Page 62

- Q1 The free fitting offer will save Gillian the most money. (£120 off. The 20% off offer only saves £103.30.)  
Q2 £0.45 or 45p  
Q3 a) £1.30  
b) 50%  
Q4 Luke should charge £2.43 for each cake to make 35% profit.

### Page 65

- Q1 a) 8:30 am  
b) 7:57 pm  
Q2 a) 18:15  
b) 00:03  
Q3 No (22:59 is 10:59 pm).  
Q4 2 hours and 30 minutes (2½ hours) or 150 minutes.  
Q5 1 hour and 49 minutes (109 minutes)  
Q6 32 minutes  
Q7 8:02 pm

### Page 66

- Q8 18:55 (6:55 pm)  
Q9 Yes, Phillip could be at the meeting place at 7:45 pm (19.45).  
Q10 She should leave home by 11:50 am.

### Page 69

- Q1 a) The 15:08 train.  
b) 15:49  
Q2 14:00 on Tuesday or 09:00 on Thursday or 11:00 on Friday.  
Q3 E.g.

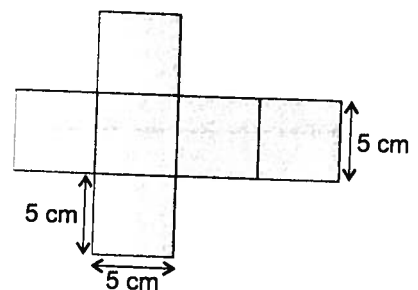
	Night 1	Night 2
First half	Streetdance	Camberwell
	Salsa Stream	Super Eights
	Super Eights	Havanas
Interval		
Second half	DUBDS	Xtreme Beats
	Havanas	DUBDS
	Mirror Ball	Salsa Stream

Other answers and layouts are possible. Streetdance must appear on night 1 only and Xtreme Beats on night 2 only. Camberwell must not appear in the same half as Streetdance or Xtreme Beats.

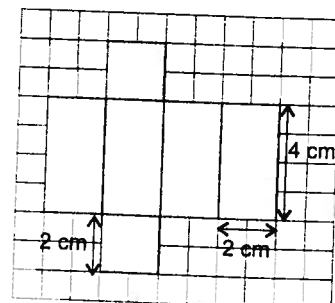
## Section Three — Shape and Space

### Page 72

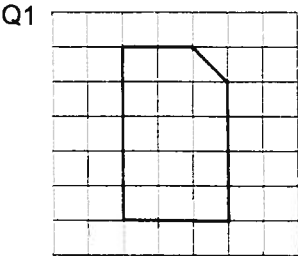
- Q1 E.g. 10 cm by 30 cm by 15 cm  
Q2 For example:



- Q3 For example:

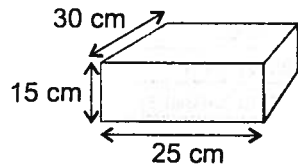


Page 73



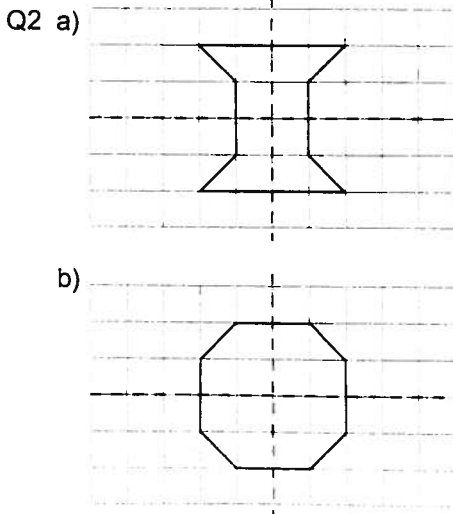
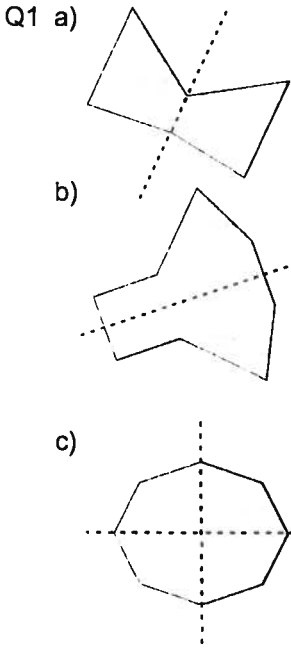
Page 74

Q1 For example:



The easiest way to send the books is to stack them on top of each other. So the box needs to be as long and as wide as the biggest book and as high as all 3.

Page 75



Page 76

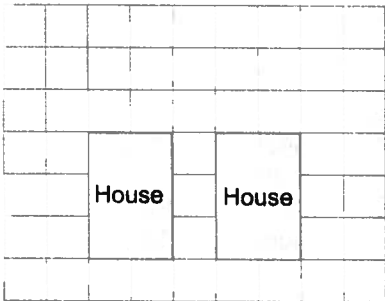
Q1 For example:

C	B	B	C
D	A	A	D
D	A	A	D
C	B	B	C

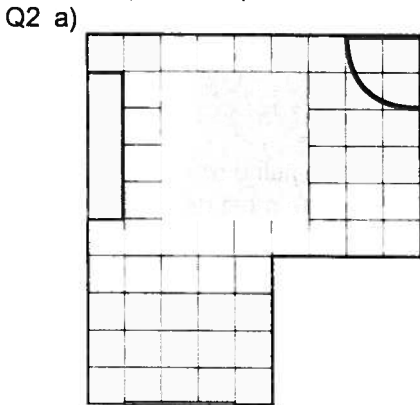
Other symmetrical patterns are possible.

Page 79

Q1 For example:



Other positions possible.



The table can go anywhere in the shaded area.  
b) No (it would block the door/window).

Page 81

- Q1 a) 4 cm  
b) 20 km  
Q2 a) 8 miles  
b) 26 miles

Section Four — Handling Data

Page 83

- Q1 a) 1.2 miles  
b) Hotel C  
c) Hotel A  
Q2 a) 42.5 miles  
b) 27.6 miles  
c) 80.1 miles

Page 85

Q1

Employee	Standard days off	Extra days off	Total days off
Mike	25	5	30
Sharon	25	2	27
Lucy	25	0	25
Phoebe	25	1	26

Q2

	Number of guests	Number of platters required	Total cost of platters (£)
Wedding 1	120	18	360
Wedding 2	80	12	240

Q3

	Interior score	Exterior score	Mechanical score	Number of modifications	Total score
Car 1	8	7	7	0	22
Car 2	7	9	9	2	23
Car 3	6	9	7	1	21

Page 86

Q1 a)

Type of cake	Tally	Frequency
Birthday		5
Wedding		2
Christening		2
Retirement	I	1
Christmas		3
		Total 13

- b) 5  
c) 13

**Page 88**

Q1 For example

Item	Quantity	Price	Total cost of items
Total cost of order			

There are other ways of drawing this table. Just make sure you've left space for all of the details you were asked for.

Q2 For example

Guest name	Starter			Main Course			Dessert		
	1	2	3	1	2	3	1	2	3
Total									

There are other ways of drawing this table. As long as you have space for all of the details listed then the table will be correct.

**Page 89**

- Q1 a) 3  
b) Yellow  
c) 17

**Page 91**

- Q1 a) 6000  
b) 3000  
c) 4000  
d) Year 5
- Q2 a) 70%  
b) 20%  
c) Year 3  
d) The percentage of flights to places in the UK stayed the same from year 1 to year 2 and then decreased from 30% of flights to 20% of flights from year 2 to year 3.

**Page 94**

- Q1 a) 8 km  
b) 7.5 miles  
c) 9 miles
- Q2 a) 130 litres  
b) 10 litres  
c) Day 1 (40 litres)
- Q3 a) 10 minutes  
b) 13 minutes  
c) About 1.5 (1½) minutes

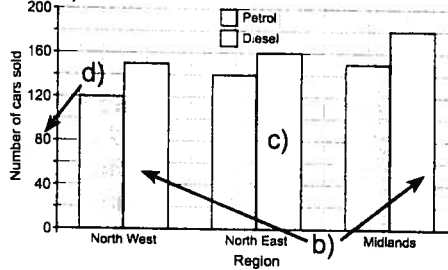
**Page 96**

- Q1 a) Shop 2  
b) 50%  
c) 25%
- Q2 a) i) 50 strikes  
ii) 25 strikes  
iii) 45 strikes  
b) 120 strikes

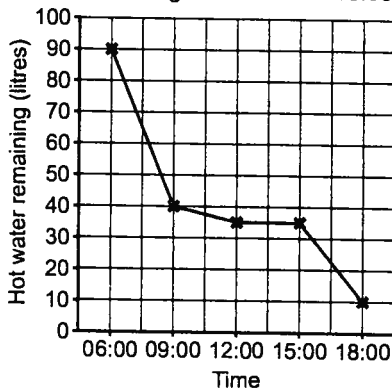
If you got the wrong answers for any of the parts of a), you'll have got a different answer to part b).

**Page 100**

Q1 a) 120



Q2 A graph to show the amount of hot water remaining from 06:00 to 18:00

**Page 103**

- Q1 Call Centre A because they answered a higher percentage of calls in under 45 seconds (the target time) in 2 of the 3 months. Call centre B only managed the same percentage of calls answered in the target time as call centre A in 1 month (Feb).
- Q2 The graph shows that as speed increases, the exterior noise level also increases.
- Q3 For example — In general, the more hours someone works in a week, the higher their annual income is. Martha doesn't fit into this pattern though — she earns less than Joseph and Eugenia even though she works more hours.

**Page 106**

- Q1 £3797.10  
Q2 1880 kg  
Q3 38 minutes  
Q4 a) 8 boxes  
b) 7 boxes

**Page 107**

- Q1 a) 13  
b) 45
- Q2 a) 3.3 miles  
b) No (it is less than the largest distance of 5.5 miles)

**Page 109**

- Q1 a) Range = £118  
Mean = £554  
b) Range = £95  
Mean = £680  
c) On average Fly Well holidays are cheaper than City Escapes holidays — the mean price of a Fly Well holiday (£607.50) is less than the mean price of a City Escapes holiday (£645).

**Page 112**

- Q1 No, he is not. It's not impossible for the weather to be warm and sunny in December, it's just very unlikely.
- Q2  $\frac{6}{24}$  or  $\frac{3}{12}$  or  $\frac{2}{8}$  or  $\frac{1}{4}$  or 0.25  
or 25%

- Q3  $\frac{30}{90}$  or  $\frac{3}{9}$  or  $\frac{1}{3}$

- Q4 a)  $\frac{4}{16}$  or  $\frac{2}{8}$  or  $\frac{1}{4}$ , 0.25 and 25%  
b)  $\frac{12}{16}$  or  $\frac{6}{8}$  or  $\frac{3}{4}$ , 0.75 and 75%

- Q5 a)  $\frac{8}{10}$  or  $\frac{4}{5}$ , 0.8 and 80%

- b) Probability of picking out a quartz necklace



# Answers — Test-style Questions

## Task 1 — Banking and Finance (Page 114)

- 1 a)  $3 \times £23\,500 = £70\,500$  (1 mark). One fifth of  $£55\,000 = 1 \div 5 \times £55\,000 = £11\,000$  (1 mark). So Sean can borrow enough money for the flat, but his deposit isn't large enough, so he can't buy it (1 mark).
- b)  $2\frac{1}{2} \times £23\,500 = £58\,750$  (1 mark).  $15\% \text{ of } £55\,000 = 15 \div 100 \times £55\,000 = £8250$  (1 mark). Sean can borrow enough money for the flat and his deposit is large enough, so he can buy the flat (1 mark).
- 2 a)  $£16\,000 - £7475 = £8525$ . So Danni will have to pay 20% of  $£8525$  (1 mark).  $20 \div 100 \times 8525 = £1705$  income tax each year (1 mark).
- b)  $£16\,000 - £8105 = £7895$ . So Danni will now have to pay 20% of  $£7895$  (1 mark).  $20 \div 100 \times 7895 = £1579$  (1 mark). This is  $£1705 - £1579 = £126$  less tax than before (1 mark).

If you got the wrong answer for part a), you'll have got a different answer to part b). As long as your working is correct, you should still get the marks.

- 3 Annual interest rate on a loan of  $£6750$  is 15%.  $15\% \text{ of } £6750 = 15 \div 100 \times 6750 = £1012.50$  (1 mark). Total to pay back =  $£6750 + £1012.50 = £7762.50$  (1 mark). So each month, Emily will have to pay:  $£7762.50 \div 12 \text{ months} = £646.875 = £646.88$  to the nearest penny (1 mark).

## Task 2 — Landscape Gardening (Page 119)

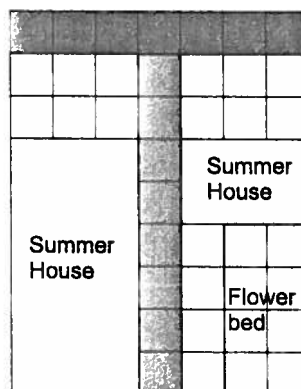
- 4 a) Diameter of the pond = 2 m. So the perimeter of the pond =  $\pi \times 2$  OR  $3.14 \times 2$  (1 mark) = 6.28 m (1 mark).  $6.28 \text{ m} \times 100 = 628 \text{ cm}$  (1 mark). Number of tiles needed =  $628 \text{ cm} \div 10 \text{ cm} = 62.8$  tiles (or 63 tiles to the nearest whole tile) (1 mark). There are 10 tiles per box, so the number of boxes needed =  $63 \div 10 = 6.3$ . So Harry needs to buy 7 boxes of tiles (1 mark).
- b) VAT is 20%. 20% of  $£4$  is  $20 \div 100 \times 4 = £0.80$  so each box will cost  $£4 + £0.80 = £4.80$  (1 mark). 7 boxes of tiles are needed,  $7 \times £4.80 = £33.60$  (1 mark).

If you got the wrong answer for part a), you'll have got a different answer to part b). As long as your working is correct, you should still get the marks.

- 5 a) Split the lawn into rectangles and work out the area of the different rectangles. For example:  
 $9 \times 5 = 45 \text{ m}^2$  (1 mark)  
 $12 - 5 = 7 \text{ m}$  (1 mark)  
 $7 \times 5 = 35 \text{ m}^2$  (1 mark)  
 So the area of turf needed =  $45 + 35 = 80 \text{ m}^2$  (1 mark)

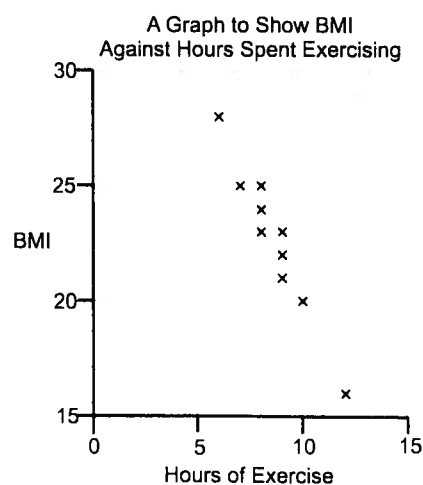
There are other ways you could have worked this out. For example, found the total area of the garden and then taken away the area of the flower bed.

- b) Each roll will cover  $2 \text{ m} \times 2 \text{ m} = 4 \text{ m}^2$  (1 mark).  $80 \text{ m}^2 \div 4 \text{ m}^2 = 20$  rolls (1 mark). Cost of 20 rolls =  $£4.75 \times 20 = £95$  (1 mark). Cost of delivery for 20 rolls =  $£14.25$ . Total cost =  $£95 + £14.25 = £109.25$  (1 mark).
- 6 a) Sunita's garden is 7 squares wide. The side of 1 square = 200 cm, so Sunita's garden is:  $7 \times 200 = 1400 \text{ cm}$  wide (1 mark). To convert cm to m, divide by 100. So Sunita's garden is  $1400 \div 100 = 14 \text{ m}$  wide (1 mark).
- b) The summer house can be built anywhere in the grey area to the left of the path OR anywhere in the smaller grey area to the right of the path, above the flower bed (see below). It should be 2 squares wide and 2 squares long. (1 mark for correct positioning of the summer house, 1 mark for a summer house of the correct size)



## Task 3 — Health and Fitness (Page 123)

- 7 a) For example:



(1 mark for choosing a sensible scale for the axes, 1 mark for labelling the axes and giving the graph a title, 1 mark for correctly plotting all data points)



- b) The more time spent exercising, the lower a person's BMI **(1 mark)**.
- 8 a)  $BMI = M \div H^2$   
 So Jane's BMI =  $55 \div (1.6^2) = 21.48$   
**(1 mark for correct calculation, 1 mark for correct answer)**
- b)  $BMI = M \div H^2$   
 So  $BMI \times H^2 = M$   
 Jane's friend's height = 1.55 m  
 Her BMI = 25.5  
 So her mass =  $25.5 \times (1.55^2) = 61.26$  kg  
**(1 mark for  $BMI \times H^2 = M$ , 1 mark for  $25.5 \times (1.55^2)$ , 1 mark for 61.26 kg or 61.3 kg)**  
 To check your answer, do the reverse of the calculation:  $BMI = M \div H^2 = 61.26 \div (1.55^2) = 25.498 = 25.5$  **(1 mark)**
- c) Jane is normal weight **(1 mark)**. Her friend is overweight **(1 mark)**.
- If you got the wrong answer for part a), you'll have got a different answer to part c) for Jane. As long as your working is correct, you should still get the marks.

#### Task 4 — Going Out (Page 125)

- 9 a) To be at the Quick Flash Sale at 15.30, they need to see either the 11.10 or 11.30 showing of Snow Age. Both of these overlap with the 12.30 fashion show, so they have to go to the 10.00 fashion show. This finishes at 11.00. It's 1 mile from Bedhams to the cinema and they can walk at 3 miles per hour. 1 hour is 60 minutes. To work out how long it'll take them to walk 1 mile:  $60 \text{ mins} \div 3 = 20$  minutes. So they will only be able to make the 11.30 film showing.  
 Timetable:  
 10.00 — Fashion Show  
 11.30 — Snow Age  
 15.30 — Quick Flash Sale  
**(1 mark for each activity included in the timetable at the correct time.)**
- You might have drawn your timetable a bit differently to this one. That's fine, as long as the times are right, you'll get the marks.
- b) The film finishes at 13.30 and it takes 20 minutes to walk to Bedhams, so they will arrive at 13.50. The sale starts at 15.30 so they will have 1 hour, 40 minutes for lunch **(1 mark)**.
- 10 a) Hannah and Wayne should get the 1735 bus from Nauton Green as it will get them to the cinema at 1755 in time for the 6 pm (1800) film **(1 mark)**. They need to set off 10 minutes before this, which is 1725 **(1 mark)**.
- b) The film plus trailers will last:  
 20 minutes + 160 minutes = 180 minutes / 3 hours **(1 mark)**. Starting at 6 pm, it should finish at 9 pm (which is 2100) **(1 mark)**. The last bus leaves Minsterbury High Street at 2125, so yes, they should be in time to catch it **(1 mark)**.

- 11 a) Betty can either buy three single boat tickets, or two return tickets.  
Single Tickets:  
 War Museum — Art Gallery: £3.75.  
 Art Gallery — Science Museum: £2.20.  
 Science Museum — War Museum: £4.50.  
 So total = £3.75 + £2.20 + £4.50 = £10.45.  
Return Tickets:  
 Option 1: Return tickets between the War Museum and Art Gallery, and between the Art Gallery and Science Museum which costs £7 + £4 = £11.  
 Option 2: Return tickets between the War Museum and Science Museum and between the War Museum and Art Gallery, which costs £8 + £4 = £12.  
 So it is cheaper to buy single tickets.  
 Total cost of boats and museum entry = £10.45 + £4.50 + £5.90 = £20.85.  
**(1 mark for comparing at least two ticket combinations, 1 mark for the decision that it is cheaper to buy 3 single tickets, 1 mark for £20.85)**
- b) Distance between Art Gallery and Science Museum on the map = 2 cm.  
 Map scale: 1 cm = 1.5 km  
 So distance in real life =  $2 \times 1.5 = 3$  km **(1 mark)**  
 Distance (in miles) = number of km  $\times 0.6$   
 =  $3 \text{ km} \times 0.6$  **(1 mark)** = 1.8 miles **(1 mark)**

#### Task 5 — Decorating (Page 130)

- 12 Each wall is  $4 \text{ m} \times 3 \text{ m} = 12 \text{ m}^2$ .  $12 \text{ m}^2 \times 4 = 48 \text{ m}^2$ .  
 The door is  $2 \text{ m} \times 1 \text{ m} = 2 \text{ m}^2$ . Two windows, both  $2 \text{ m} \times 1 \text{ m} = 2 \text{ m}^2$ , so  $2 \times 2 \text{ m}^2 = 4 \text{ m}^2$ .  
 Total wall area =  $48 \text{ m}^2 - 2 \text{ m}^2 - 4 \text{ m}^2 = 42 \text{ m}^2$   
**(1 mark)**  
 1 litre covers  $12 \text{ m}^2$ , so Teresa will need:  
 $42 \text{ m}^2 \div 12 \text{ m}^2 = 3.5$  litres for 1 coat.  
 For 3 coats of paint, Teresa will need:  
 $3 \times 3.5 \text{ litres} = 10.5 \text{ litres}$  **(1 mark)**.  
 Each tin is 2 litres, so she will need:  
 $10.5 \div 2 = 5.25$  tins of paint, so 6 tins in total **(1 mark)**.
- 13 Area of room =  $36 \text{ m}^2$   
 James needs 0.5 litres of paint per square metre, so he needs to make:  
 $36 \times 0.5 = 18$  litres of light blue paint **(1 mark)**.  
 The total number of parts in the ratio =  $1 + 2 = 3$ . So each part is:  $18 \div 3 = 6$  litres of paint **(1 mark)**.  
 James needs 2 parts white paint, which is:  
 $6 \times 2 = 12$  litres.  
 Each tin holds 2 litres, so he needs:  
 $12 \div 2 = 6$  tins **(1 mark)**.
- 14 a) Sandeep has put up 30 tiles in 2 hours (1 pm til 3 pm = 2 hours), so he is working at a pace of:  
 $30 \div 2 = 15$  tiles per hour **(1 mark)**.  
 In another 3 hours (3 pm til 6 pm = 3 hours), he can put up:  $3 \times 15 = 45$  tiles **(1 mark)**.  
 In total, by 6 pm he will have put up  $30 + 45 = 75$  tiles. So, no, he won't finish tiling the bathroom by 6 pm **(1 mark)**.

b) For example:

T1	T3	T2	T2	T3	T1
T2	T3	T1	T1	T3	T2
T2	T3	T1	T1	T3	T2
T1	T3	T2	T2	T3	T1

(1 mark for a pattern measuring 6 tiles by 4 tiles, 1 mark for using 8 of each type of tile, 1 mark for a symmetrical pattern with no gaps)

### Task 6 — A Car Boot Sale (Page 133)

15 a) For example,

Item	Price	Tally	Total sold	Money made
CD	£0.50			
DVD	£1.00			
Books	£0.30			
Comics	£0.20			
Total:				

(1 mark for a clearly structured and labelled table, 1 mark for space for recording items and prices, 1 mark for space for recording numbers sold and money made, 1 mark for space for recording total money made.)

b) i) Calculate the volume of a box:

$$\text{Volume} = \text{length} \times \text{width} \times \text{height} \\ = 40 \times 50 \times 20 = 40\,000 \text{ cm}^3 \text{ (1 mark)}$$

Calculate the volume of a crate:

To convert m into cm, times by 100:

$$1 \times 100 = 100 \text{ cm.}$$

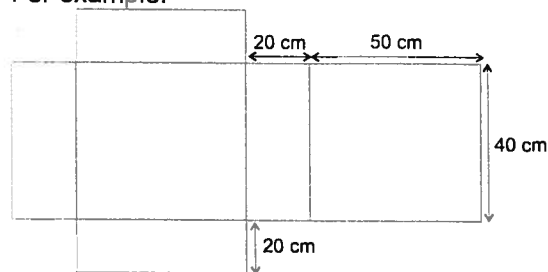
$$\text{Volume} = 100 \times 80 \times 40 = 320\,000 \text{ cm}^3 \text{ (1 mark)}$$

He will be able to fit:

$$320\,000 \div 40\,000 = 8 \text{ boxes into each crate} \\ \text{(1 mark).}$$

There's more than one way to work this out, so don't worry if you did it differently. As long as your method was correct, you'll still get the marks.

ii) For example:



(1 mark for a correctly drawn net — with or without the lid, 1 mark for at least three correct dimensions labelled on the net)

c) Total cost of buying the materials =

$$£15.05 + £15.75 + £9.70 = £40.50 \text{ (1 mark).}$$

Jess wants to make a 20% profit.

$$20\% \text{ of } £40.50 = 20 \div 100 \times £40.50 = £8.10$$

So Jess would need to sell all the necklaces for:

$$£40.50 + £8.10 = £48.60 \text{ (1 mark).}$$

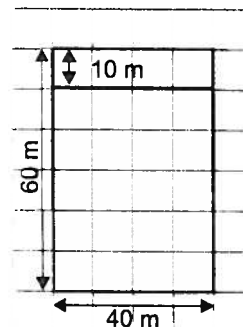
So she needs to sell each necklace for:

$$£48.60 \div 15 = £3.24 \text{ (1 mark).}$$

You might have worked out the actual cost per necklace first (£2.70) and then added on 20% to get the price she needed to sell it at. As long as your method was correct, you'll still get the marks.

### Task 7 — City Planning (Page 136)

16 a) i)



(1 mark for a correctly drawn view, 1 mark for correctly labelled dimensions.)

ii) Length of front walls of building A =

$$2 \text{ m} + 3 \text{ m} + 3 \text{ m} + 3 \text{ m} + 2 \text{ m} = 13 \text{ m} \text{ (1 mark).}$$

Length of front walls of building B =

$$3 \text{ m} + 2 \text{ m} + 2 \text{ m} + 2 \text{ m} + 2 \text{ m} = 11 \text{ m} \text{ (1 mark).}$$

Both buildings are 50 m high.

Building A would need:

$$50 \times 13 \text{ m} = 650 \text{ m}^2 \text{ of glass}$$

Which would cost:

$$650 \times £100 = £65\,000 \text{ (1 mark).}$$

Building B would need:

$$50 \times 11 \text{ m} = 550 \text{ m}^2 \text{ of glass}$$

Which would cost:

$$550 \times £100 = £55\,000 \text{ (1 mark).}$$

Building A would cost

$$£65\,000 - £55\,000 = £10\,000 \text{ more (1 mark).}$$

There are other ways of calculating how much more the front walls of building A would cost, you don't need to have used the same working as above to get full marks.

- b) Split the car park into two rectangles.  
 For example, area of bottom rectangle  
 $= 10 \text{ m} \times 16 \text{ m} = 160 \text{ m}^2$   
 Area of top rectangle  $= 4 \text{ m} \times 5 \text{ m} = 20 \text{ m}^2$  **(1 mark)**.  
 So total area of car park  
 $= 160 \text{ m}^2 + 20 \text{ m}^2 = 180 \text{ m}^2$  **(1 mark)**.  
 Reading off the graph, 180 m<sup>2</sup> of concrete would  
 cost £7000 **(1 mark)**.

There's more than one way to work out the area of the car park, so don't worry if you did it differently. As long as your method was correct, you'll still get the marks.

- c) i) The houses that would be classed as low-cost are the ones in the categories £0 - £99 999 and £100 000 - £149 999. This is  $4\% + 14\% = 18\%$  of the houses built in 2012 **(1 mark)**.  
 $18\%$  of 3600 is:  $18 \div 100 \times 3600 = 648$ .  
 $25\%$  of 3600 is:  $25 \div 100 \times 3600 = 900$  **(1 mark)**.  
 $900 - 648 = 252$  extra houses needed to have been built to reach the target **(1 mark)**.

You could also answer this question by working out that 7% more houses needed to have been built, and that 7% of 3600 is 252.

- ii) 8 out of 10 will cost over £150 000, so 2 out of 10 will be low-cost **(1 mark)**. So  
 $2 \div 10 \times 100 = 20\%$  will be low-cost **(1 mark)**.

## Task 8 — A Christmas Fair (Page 141)

- 17 a) i) Probability of drawing a red ball / winning  $= \frac{3}{15}$  or  $\frac{1}{5}$  **(1 mark)**.

So number of people likely to win out of 140 people  $= 3 \div 15 \times 140 = 28$  **(1 mark)**.

- ii) For example:

Colour Ball	Tally
Red	
Green	
Black	

**(1 mark for choosing any sensible way of recording the number of each colour ball picked, 1 mark for correctly labelled columns and rows)**

b) i)

	Game 1	Game 2	Game 3	Total
Team 1	5	5	10	20
Team 2	2	10	5	17
Team 3	10	2	2	14

**(1 mark for each correctly filled in column. Maximum marks = 3.)**

- ii) Team 1 had a mean score of:  
 $20 \div 3 = 6.67$ .  
 Team 2 had a mean score of:  
 $17 \div 3 = 5.67$ .  
 Team 3 had a mean score of:  
 $14 \div 3 = 4.67$ .  
 So Team 1 had the highest mean score **(1 mark)**.  
 The modal score for Team 1 was 5.  
 There was no modal score for Team 2.  
 The modal score for Team 3 was 2.  
 So Team 1 had the highest modal score **(1 mark)**. So yes, Adil is right **(1 mark)**.

- c) The jar weighs 1.54 kg, so convert all the weights guessed to kg.

Nick (3 lbs).

To find how many kg are in 3 lbs, divide 1 kg by 2.2, then multiply by 3:

$$1 \div 2.2 \times 3 = 1.36 \text{ kg} \text{ (1 mark)}$$

Carys (2.2 lbs).

1 kg = 2.2 lbs, so Carys' guess = 1 kg **(1 mark)**.

Evan (2500 g).

Convert from g to kg:

$$2500 \div 1000 = 2.5 \text{ kg} \text{ (1 mark)}$$

Paul (32 oz).

16 oz = 1 lbs. So 32 oz = 2 lbs **(1 mark)**.

To find how many kg are in 2 lbs, divide 1 kg by 2.2, then multiply by 2:

$$1 \div 2.2 \times 2 = 0.9 \text{ kg} \text{ (1 mark)}$$

Leila came closest to guessing the correct weight **(1 mark)**.