MATHS
PROBLEMS

Information

- There are 6 tasks in this booklet.
- Some are short and some are long.
- Answer in the spaces provided.
- If you need extra space use the back page.
- You may use a calculator or any other mathematical equipment.
- There is Resource Sheet to help you with some tasks.

Instructions

- You have 50 minutes to answer as much as you can.
- It is important to show all your working.

Name

Class

School

Resource Sheet

You may find **some** of the information on this sheet useful for some questions.

You must decide which information to use – you will not need all of it!

Coins

Coin	Value	Diameter	Thickness	Weight
	50p	27.3mm	1.78mm	8.0g
	20p	21.4mm	1.7mm	5.0g
	10p	24.5mm	1.85mm	6.5g
	5p	18.0mm	1.7mm	3.25g

Some Imperial Measures

1 foot = 12 inches (This can be written: 1' = 12")

1 pound = 16 ounces (This can be written: 1lb = 16oz)

1 gallon = 8 pints (This can be written: 1gal = 8pts)

Some Imperial to Metric conversions (to 3 significant figures)

1 foot = 30.5 centimetres

1 pound = 454 grams

1 gallon = 4.55 litres

Nines

This calculation uses **three 9**s:

9 × 9 – 9

The answer is **72**

Use three 9s to write a calculation with the biggest possible answer.

You can use any mathematical symbols, but no other digits.

You must write the calculation, but you do not have to work out the answer unless you want to.

Pool

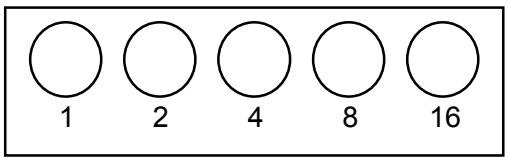
This notice was at one end of an indoor swimming pool.

Explain why the notice is silly.

Factory

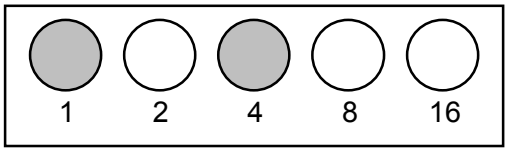
A noisy factory has 31 workers.

The manager uses lights to contact workers.



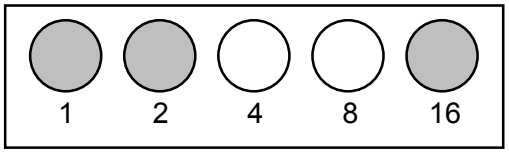
The manager wants to contact worker number 5.

She turns on lights 1 and 4.



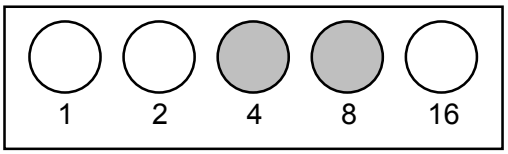
5 = 1 + 4

To contact worker number 19 she turns on lights 1, 2 and 16.

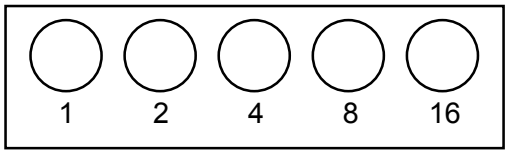


19 = 1 + 2 + 16

(a) What is the number of the worker shown by these lights?



(b) Shade in lights to show worker number 11.



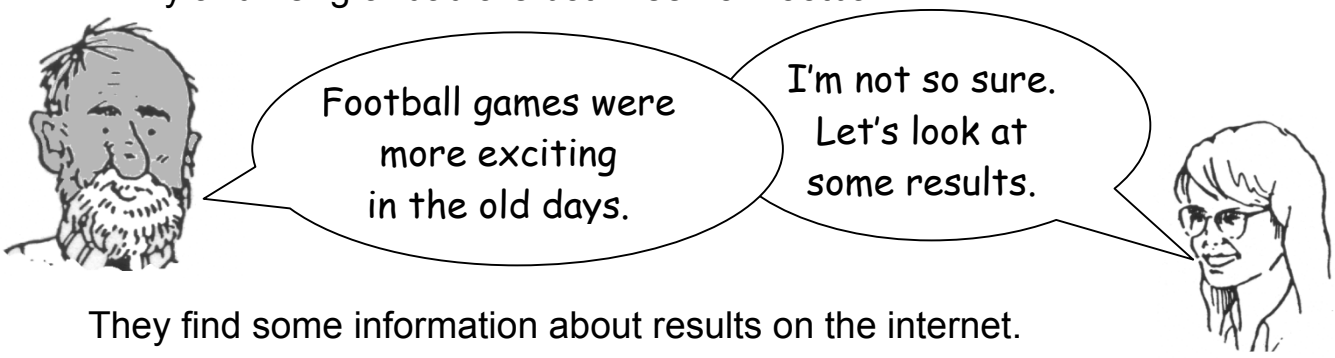
(c) Explain why this system of lights can be used to contact 31 different workers.

(d) Another light is added.
How many different workers can now be contacted?

(e) How many different workers could be contacted with *n* lights?

Good old days?

Amy and her grandad are both keen on football.



They find some information about results on the internet.

1911 – Saturday April 22nd		
Aston Villa	4 – 2	Manchester United
Blackburn Rovers	3 – 0	Tottenham Hotspur
Everton	1 – 1	The Wednesday
Manchester City	1 – 2	Bristol City
Oldham Athletic	0 – 0	Bury
Sunderland	1 – 1	Notts. County
Woolwich Arsenal	2 – 0	Preston North End

2011 – Saturday April 23rd		
Aston Villa	1 – 1	Stoke City
Blackpool	1 – 1	Newcastle United
Chelsea	3 – 0	West Ham United
Liverpool	5 – 0	Birmingham City
Manchester United	1 – 0	Everton
Sunderland	4 – 2	Wigan Athletic
Tottenham Hotspur	2 – 2	West Bromwich Albion
Wolverhampton Wanderers	1 – 1	Fulham

These results are for Saturday April 22nd **1911** and Saturday April 23rd **2011**. They are both for the top division.

For example, the first table shows that when Aston Villa played Manchester United in April 22nd 1911 , Aston Villa scored 4 goals and Manchester United scored 2 goals.

Use the information in the tables to answer these questions.

You **must** support your answers with numbers or calculations.

(a)

If two teams score the same number of goals in a game then it is a draw. Draws were more likely a hundred years ago than they are now.

Do you agree with Amy?

(b)

Games **were** more exciting a hundred years ago.

Do you agree with Amy's Grandad?

Money, money!

Mia wants to make a wooden money box.

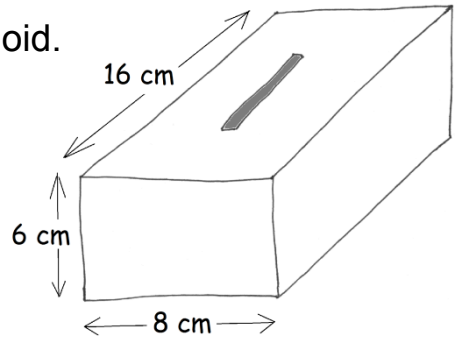
She will save 20p coins in the box.

The money box will be in the shape of a cuboid.

Mia makes this rough sketch of her design.

She will cut a slot for the 20p coins symmetrically into its top.

She will use wood that is 1 cm thick.



(a) Sketch all the pieces of wood that Mia will need.
Show the dimensions of each piece of wood.

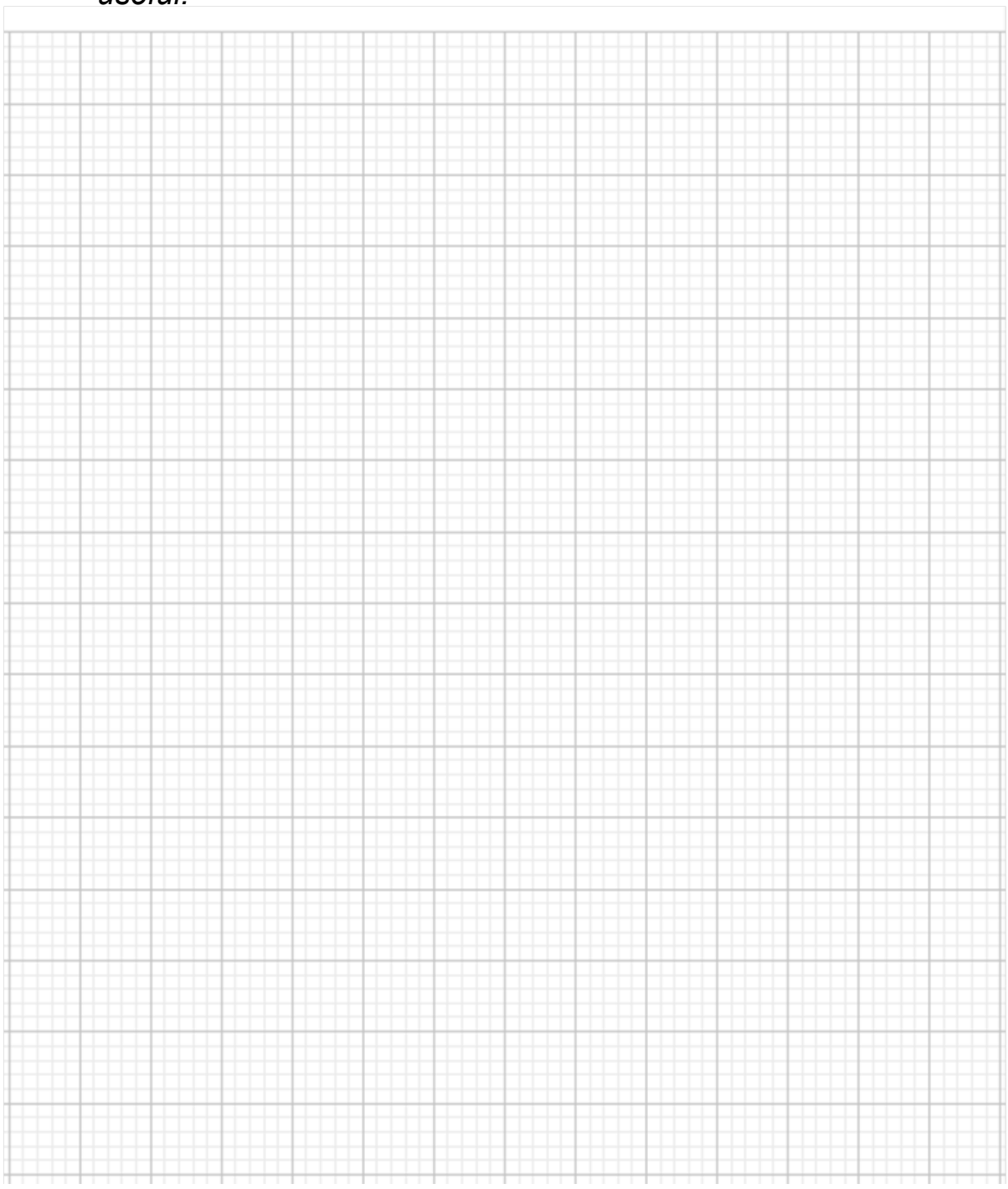
(b) Make a full scale drawing of the top of the box.

Show exactly where the slot for the 20p coins should be cut.

Leave in any extra lines you may need to draw.

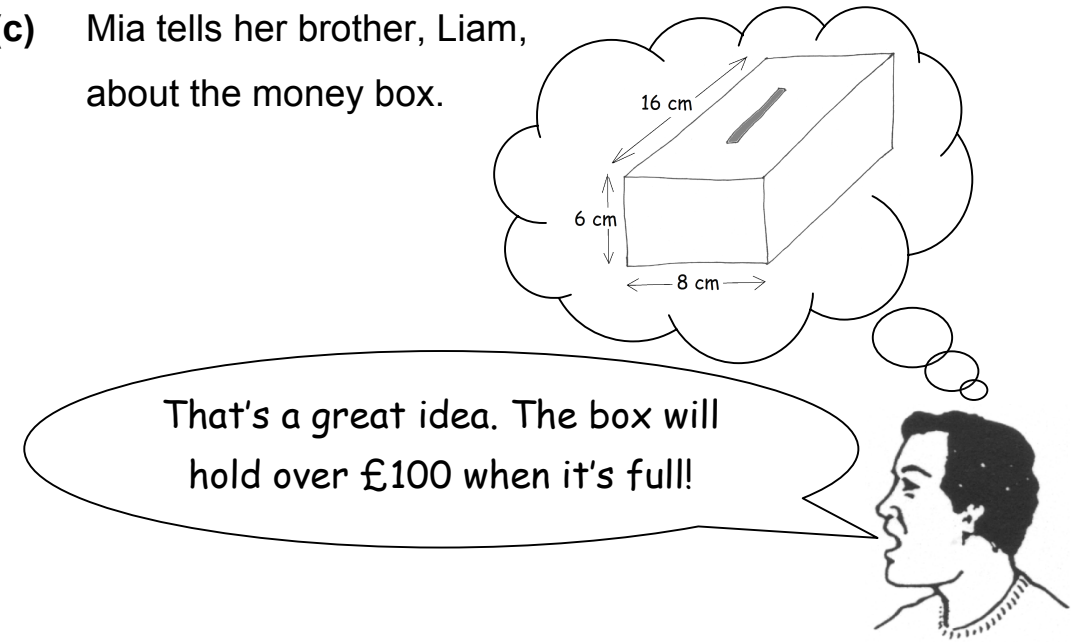
These will help to show how you worked out where to put the slot.

You may find some of the information on the Resource Sheet useful.



***Money, money!* continues on the next page.**

(c) Mia tells her brother, Liam, about the money box.



Is Liam right?

You **must** support your answer with some calculations.

You may find some of the information on the Resource Sheet useful.

Cooking

Tom has a microwave oven, a grill and a hob in his kitchen.

Look at these cooking instructions from a pack of fresh sprouts.

microwave

sprouts – to microwave

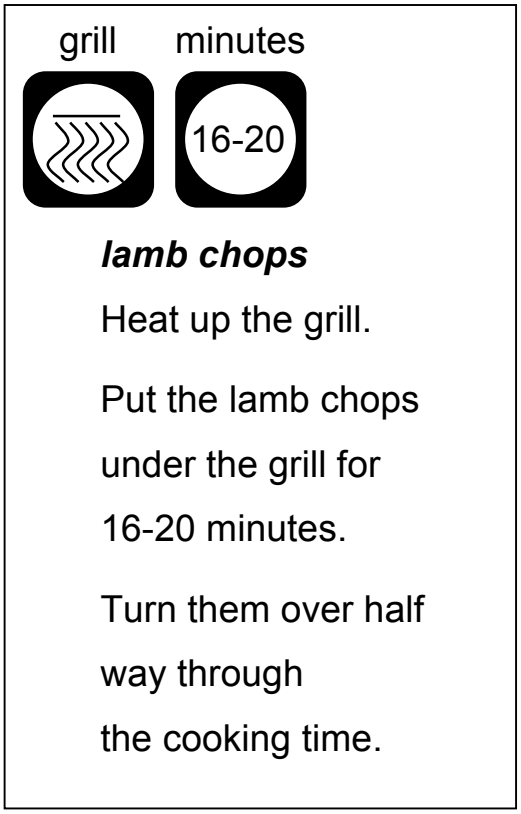
	650 watt	750 watt	850 watt
Cook	8 mins	6 mins	4 mins
Stand	1 min	1 min	1 min
Total	9 min	7 min	5 min

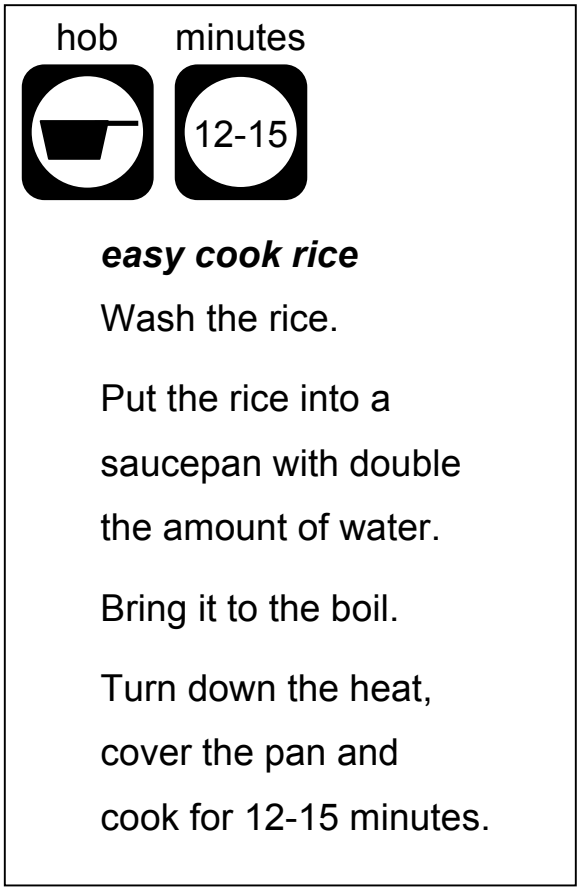
Adjust times to suit your own microwave oven.

Tom has a 950 watt microwave oven.

a) Use the information to estimate how long it will take Tom to cook the sprouts in his microwave oven and leave them to stand.

Look at these cooking instructions from a packet of rice and a pack of lamb chops.





Tom is going to cook the lamb chops, the rice and the sprouts.

Cooking **continues on the next page.**

(b) Make a timetable to show when Tom should do each task.

You should allow:

10 minutes for the grill to heat up for the lamb chops,

2 minutes to wash the rice

5 minutes for the water to boil after he has put the washed rice in.

All the food must be just ready at 1 o'clock.