

**Monday 16 January 2012 – Morning**

**GCSE APPLICATIONS OF MATHEMATICS**

**A382/01 Applications of Mathematics 2 (Foundation Tier)**



Candidates answer on the Question Paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

**Duration:** 1 hour 30 minutes



Candidate forename		Candidate surname	
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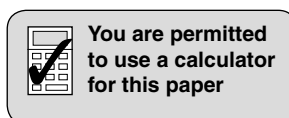
Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (\*).
- The total number of marks for this paper is **90**.
- This document consists of **24** pages. Any blank pages are indicated.



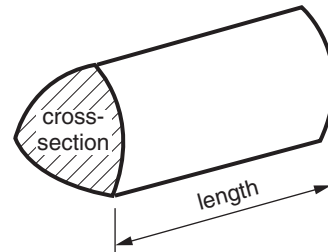
This paper has been pre modified for carrier language

## Formulae Sheet: Foundation Tier

**Area of trapezium** =  $\frac{1}{2} (a + b)h$

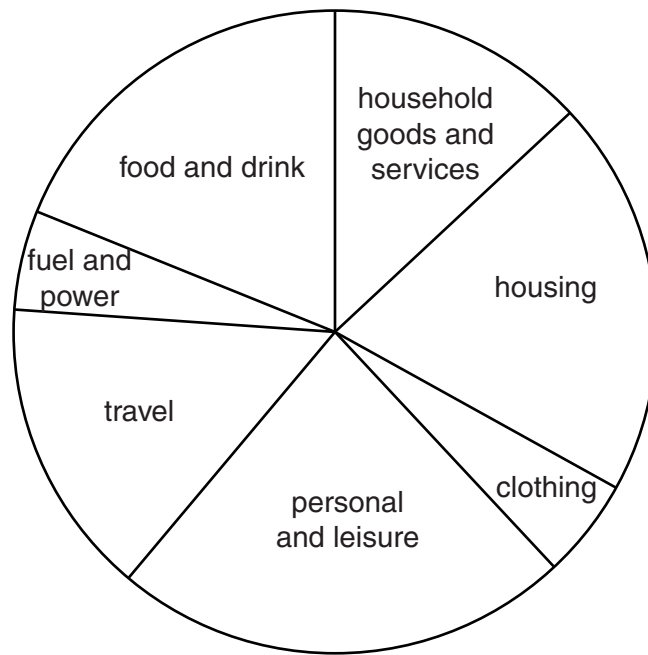


**Volume of prism** = (area of cross-section)  $\times$  length



**PLEASE DO NOT WRITE ON THIS PAGE**

- 1 This pie chart shows how the people in an average household spent their money in 2009.



- (a) Approximately what fraction of the total money was spent on **personal and leisure**?

Put a ring around one of these fractions.

$$\frac{1}{2} \quad \frac{1}{4} \quad \frac{1}{3} \quad \frac{3}{4} \quad \frac{2}{3}$$

[1]

- (b) 5% of the total money was spent on **fuel and power**.

Approximately what percentage was spent on **travel**?

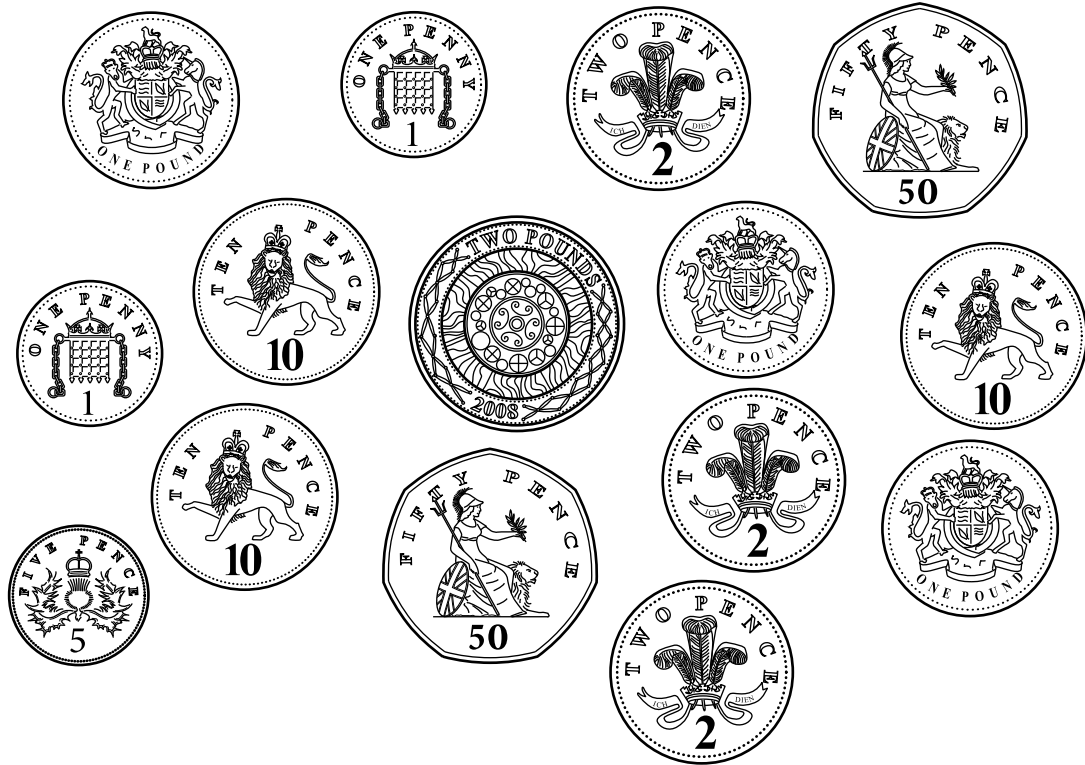
(b) \_\_\_\_\_ % [1]

- (c) An average household spent £560 a week altogether.

Estimate the amount spent on **food and drink**.

(c) £ \_\_\_\_\_ [2]

2 Megan has these fifteen coins in her purse.



(a) What is the total value of the coins in Megan's purse?

(a) £ \_\_\_\_\_ [2]

- (b) Megan wants to pay exactly £3.70 for this meal deal.  
The table shows one way that she can do this.

Complete the table to show three more ways that Megan can use her coins to pay exactly £3.70.

**meal deal –**  
a main course  
and a sweet for  
**£3.70**

Values of the coins							
£2	£1	50p	20p	10p	5p	2p	1p
1	1	1		2			

[3]

- (c) Megan pays £3.70 out of her purse.

What is the greatest number of coins she could have left in her purse?

(c) \_\_\_\_\_ coins [2]

- 3 These competitions have entries in different groups for competitors of different ages.

<b>Maths competition</b>	
<i>group</i>	<i>age</i>
1	Under 10
2	10 to 13
3	14 to 16

<b>Swimming competition</b>	
<i>group</i>	<i>age</i>
1	Under 8
2	9 to 12
3	13 to 15

<b>Art competition</b>	
<i>group</i>	<i>age</i>
1	Under 12
2	12 and over

Jan, Tom and Ben enter all three competitions.

- (a) Jan is nine years old.

Which group is she in for each competition?

Maths competition: group \_\_\_\_\_

Swimming competition: group \_\_\_\_\_

Art competition: group \_\_\_\_\_

[2]

- (b) Tom is in group 2 for all three competitions.

How old is Tom?

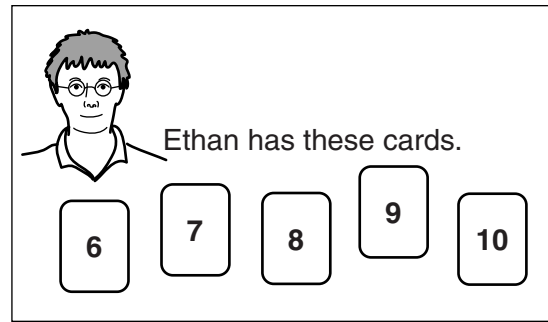
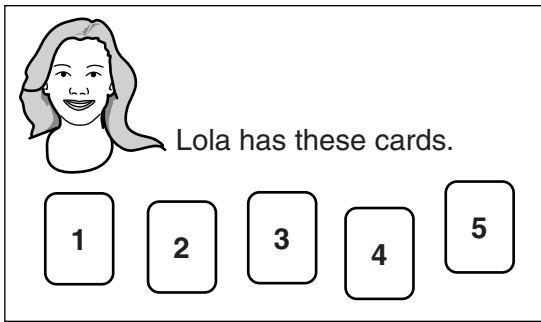
(b) \_\_\_\_\_ [1]

- (c) Ben is in the oldest group for all three competitions.

What is the oldest that Ben could be?

(c) \_\_\_\_\_ [1]

- 4 Lola and Ethan play some games with number cards.



At the start of each game, Lola and Ethan mix up their five cards and put them face down on the table. Then they each pick one of their cards and turn it over.

- (a) Look at the five different games below.

Who is **more likely** to score a point in each game?  
For each game tick **Lola** or **Ethan**.

Games		
Score a point if you pick...	Lola	Ethan
game 1: an even number		
game 2: a square number		
game 3: a number less than 8		
game 4: a multiple of 3		
game 5: a prime number		

[3]

- (b) Lola and Ethan keep the same cards to play a new game.

Write a rule for a new game using the cards in which it is **impossible** for Lola to score a point, but possible for Ethan to score a point.

Score a point if you pick ... \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [1]

5 Match each question to the correct calculation.

One is matched for you.

Price for each sweet	
Chew	2p
Chock Bite	4p
Peppermint	5p
Fruit Burst	9p

Josh and Lucy each buy a Fruit Burst and a Chock Bite, and Jacob buys a Peppermint. What is the total cost?

9 boys and 4 girls each buy a Chew and a Peppermint. What is the total cost?

Chris buys a Fruit Burst, 4 Chews and a Peppermint. What is the total cost?

Peter buys a Fruit Burst, and his 4 friends each buy a Chew and a Peppermint. What is the total cost?

Amy has 9 single left-hand gloves, 4 pairs of gloves and 5 single right-hand gloves. How many gloves does she have altogether?

Greg has 9 pairs of cotton socks, 4 pairs of woollen socks, and 5 odd socks. How many socks does he have altogether?

$$9 + 4 \times 2 + 5$$

$$(9 + 4) \times 2 + 5$$

$$(9 + 4) \times (2 + 5)$$

$$9 + 4 \times (2 + 5)$$

[5]



- 6 The screen shows the programmes that were on five television channels one afternoon. The programme **In the News** started at 15:30 and ended at 16:00.

Channel	15:30	16:00	16:30	17:00	17:30
<b>Stanley</b>	In the News	The Music Show		Critics' Corner	Topic of the Week
<b>Science now</b>	Inventor's Opportunity		Desert Life	Creatures of the Deep	Our Changing World
<b>Kidzone</b>	Kidz News	Living History		Space Travel	
<b>At home</b>	Let's Get Baking!		Gardening Week	You and your Car	
<b>Just movies</b>	Film Talk	The King and the Castle			

On each channel, the first programme started at 15:30 and the last programme ended at 18:00.

- (a) **Desert Life** started at 16:15.  
How many minutes did it last?

(a) \_\_\_\_\_ minutes [1]

- (b) Katie watched **The Music Show**. When it finished she switched to **Space Travel**.  
How many minutes of **Space Travel** did Katie miss?

(b) \_\_\_\_\_ minutes [1]

- (c) (i) How many of the programmes were 30 minutes long?

(c)(i) \_\_\_\_\_ [1]

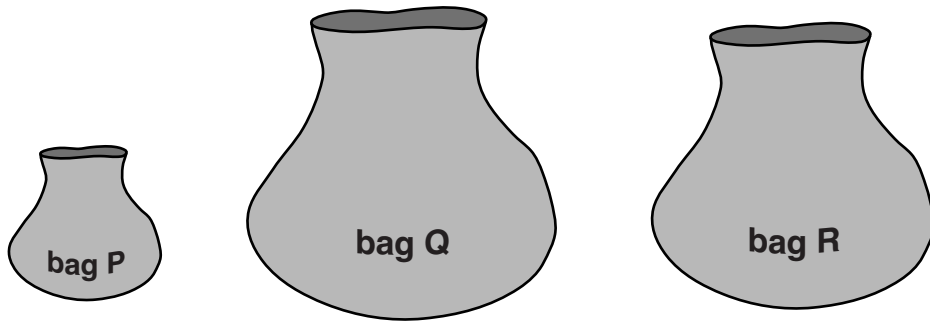
- (ii) What was the modal length of the programmes?

(ii) \_\_\_\_\_ minutes [1]

- (d) The mean length of the four programmes showing on Stanley was  $37\frac{1}{2}$  minutes.  
What was the mean length of the four programmes showing on Kidzone?

(d) \_\_\_\_\_ minutes [1]

7 Jess has three bags of marbles.



Bag Q has 3 times as many marbles as bag P.  
 Bag R has 2 fewer marbles than bag Q.

(a) (i) When there are 6 marbles in bag P, how many marbles are there in bag Q and in bag R?

(a)(i) bag Q: \_\_\_\_\_ marbles; bag R: \_\_\_\_\_ marbles [2]

(ii) When there are 21 marbles in bag Q, how many marbles are there in bag P and in bag R?

(ii) bag P: \_\_\_\_\_ marbles; bag R: \_\_\_\_\_ marbles [2]

(iii) Think of a different number of marbles there could be in bag P.  
 Fill in the table to show the number of marbles in each bag.

bag P	bag Q	bag R

[1]

(b) There are  $p$  marbles in bag P.

Use  $p$  to write an expression for the number of marbles in bag R.

(b) \_\_\_\_\_ [2]

(c) Jess says: 'There could be 8 marbles in bag R.'

Is Jess correct? Put a ring around **Yes**, **No** or **Cannot tell**.

**Yes**

**No**

**Cannot tell**

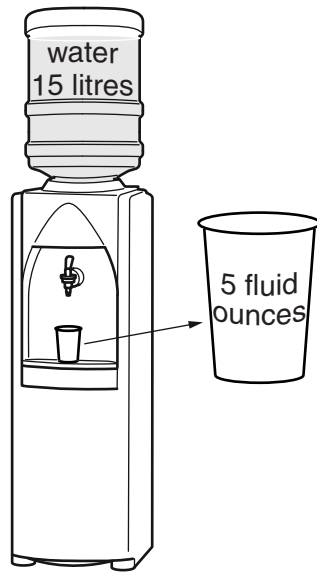
Explain your answer.

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[1]

- 8 A full bottle for this water cooler holds 15 litres.  
A plastic cup holds 5 fluid ounces.



**Conversion chart**  
(to the nearest whole number)

fluid ounces	millilitres
10	284
8	227
6	170
4	114
2	57
0	0

- (a) How many cups could the cooler fill from one full bottle of water?

Use the conversion chart to help you.

(a) \_\_\_\_\_ cups [4]

(b)



bottle of water  
£7.90



pack of plastic cups  
£3.12 for 100 cups

The cups are sold in packs of 100.

Maria orders 5 bottles of water.  
She orders enough cups for all of the water.

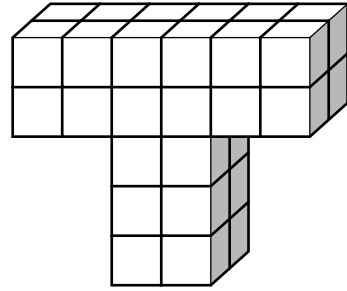
Complete the order form for the bottles of water and the packs of cups.

Item	Number ordered	Price each	Total price
bottle of water	5	£7.90	£
pack of 100 cups			£
		Total	£

[5]

- 9 Luke has 50 small cubes.  
He uses some of his cubes to make this T-shape prism.

How many cubes does he have left?



\_\_\_\_\_ [3]

- 10 A £1 coin has a weight of 9.5 grams.

Bethan has 570 grams of £1 coins.



- (a) How many £1 coins does Bethan have?

(a) \_\_\_\_\_ [1]

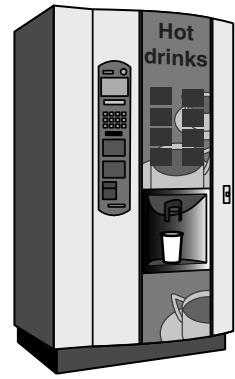
(b) This hot drinks machine takes 50p, 20p, 10p and 5p coins.

The different coins have different weights.

The machine uses the weights of the coins to tell how much money has been put in.

Mohammed emptied all the coins out of the machine.

The spreadsheet shows the weight in grams of different coins, and the total weight of the coins of each value that he took out of the machine.

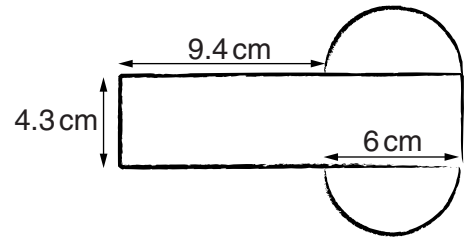


	A	B	C	D	E	F
1	<b>Coin</b>	<b>Weight of one coin (grams)</b>	<b>Total weight (grams)</b>			
2	50p	8	376			
3	20p	5	115			
4	10p	6.5	195			
5	5p	3.25	29.25			

What was the total value of all the coins in the machine?

(b) £ \_\_\_\_\_ [6]

- 11 This is a sketch of the net of a solid shape.  
The net is made up of a rectangle and two semicircles.



- (a) Construct an accurate net of the shape.  
One line has been drawn for you.



[4]

- (b)\* The net can be folded up into a solid.

Describe the solid.

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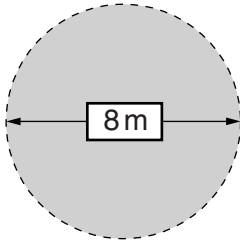


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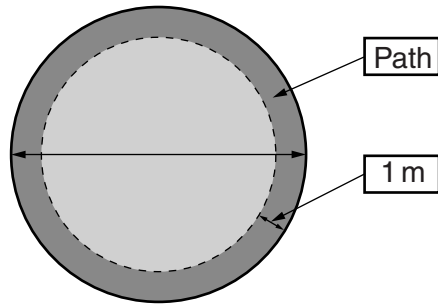
[2]



12 The distance across a circular lawn is 8 metres.



Liam wants to make a path 1 metre wide around the edge of the lawn



(a) (i) Show that the distance across the **lawn and path** is 1.25 times the distance across the lawn.

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[2]

(ii) The distance around the outer edge of the path will be greater than the distance around the inner edge of the path.

How many times greater will it be?

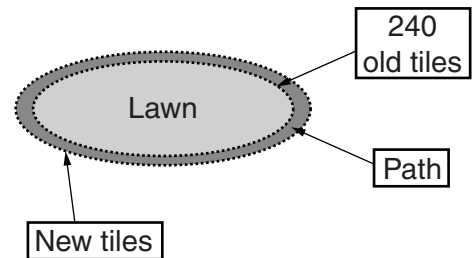
(a) (ii) \_\_\_\_\_ times greater [1]

(b) The lawn has a circle of edging tiles all the way round it. There are 240 tiles in this circle.

Liam wants to put new edging tiles in a circle all the way round the outer edge of the path. The new tiles are the same size as the old tiles.

The tiles are sold in packs of 30.

How many packs of tiles should Liam buy?



(b) \_\_\_\_\_ packs [3]

- 13 Mr Lee records the scores of ten students in a game. Then he divides the students into two teams of five.

Team 1	
Name	Score
Anna	8
Carlos	6
Ellen	5
Gary	10
Ian	6

Team 2	
Name	Score
Bola	4
Daniel	14
Fiona	7
Hanna	3
Jack	13

- (a) Explain why these two teams are not evenly matched.

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[1]

- (b) (i) Divide the students into two evenly matched teams.

Team 1	Team 2

[2]

- (ii) Explain why your teams are evenly matched.

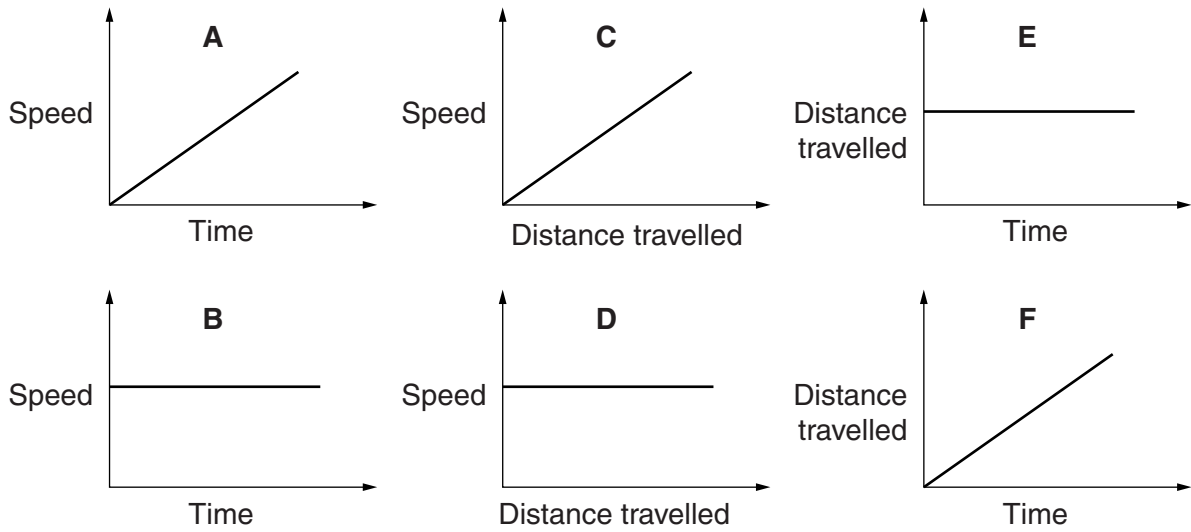
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[1]

14 Each of these graphs represents part of a journey.



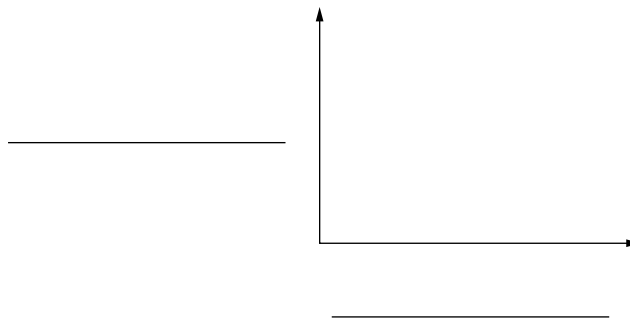
(a) Complete the table to show which description is represented by each graph. The first is done for you.

Graph	Description of the journey			
	<i>I travelled more and more quickly.</i>	<i>I travelled at a steady speed.</i>	<i>I travelled more and more slowly.</i>	<i>I stayed still.</i>
A	✓			
B				
C				
D				
E				
F				

[3]

(b) Sketch a graph which represents a journey in which *I travelled more and more slowly.*

Remember to label the axes.



[1]

**15\*** A fishing club has 47 members. It sends out a printed newsletter every month. Jake wants to find out whether the members of the club would prefer to have the newsletter on-line instead of in print. He puts an internet survey on the club website.

*Survey question:*

Would you prefer to have the club newsletter on-line or in print?

on-line

in print

*Survey results:*

on-line: 11    in print: 10    total responses: 21

Jake says:

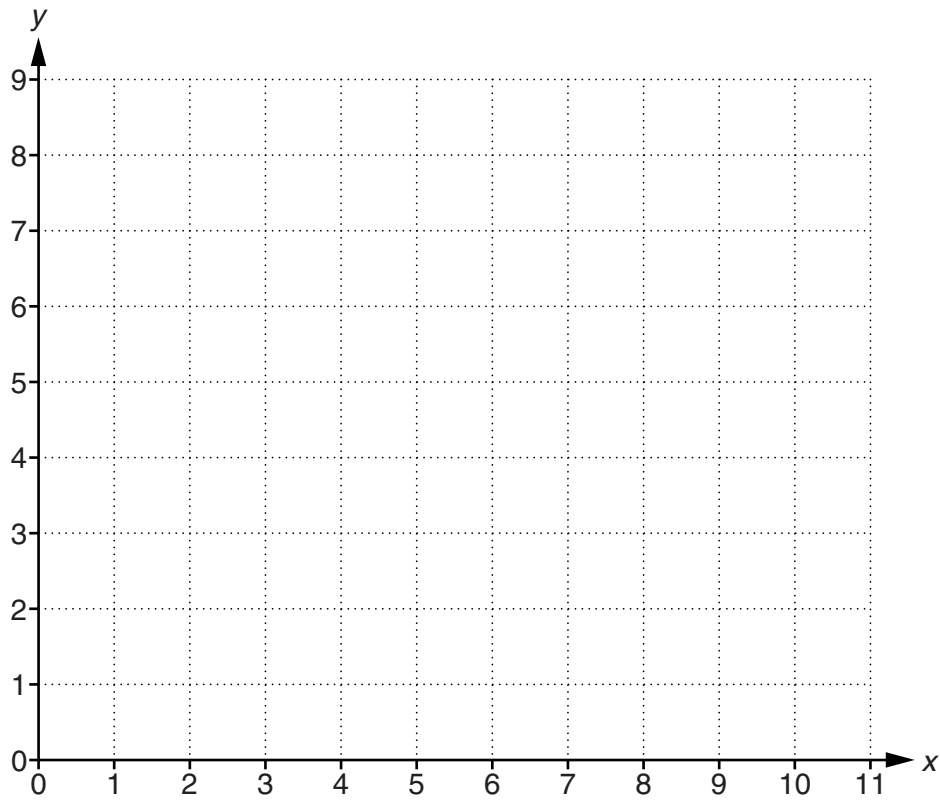


The results of the survey show clearly that most members of the club would prefer to have the newsletter on-line.

Give three reasons why Jake is wrong.

- 1 \_\_\_\_\_
  - 2 \_\_\_\_\_
  - 3 \_\_\_\_\_
- \_\_\_\_\_ [3]

- 16 (a) Draw a straight line from the origin (0, 0) to the point (4, 3) and continue the line to the edge of the grid.



[1]

- (b) Show how this line may be used to find  $\frac{3}{4}$  of 10.

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[2]

- 17 The table gives the population of the United Kingdom from the census data in the 20th century. The populations are given in millions, rounded to the nearest million.

Year	United Kingdom	England & Wales	Scotland	Northern Ireland
1901	38	33	4	1
1911	42	36	5	1
1921	44	38	5	1
1931	46	40	5	1
1941	48	42	5	1
1951	50	44	5	1
1961	53	46	5	1
1971	56	49	5	2
1981	56	50	5	2
1991	58	51	5	2

- (a) Explain why the population data for England and Wales, Scotland and Northern Ireland does not always add up to the population for the United Kingdom. (1961 is an example of this.)

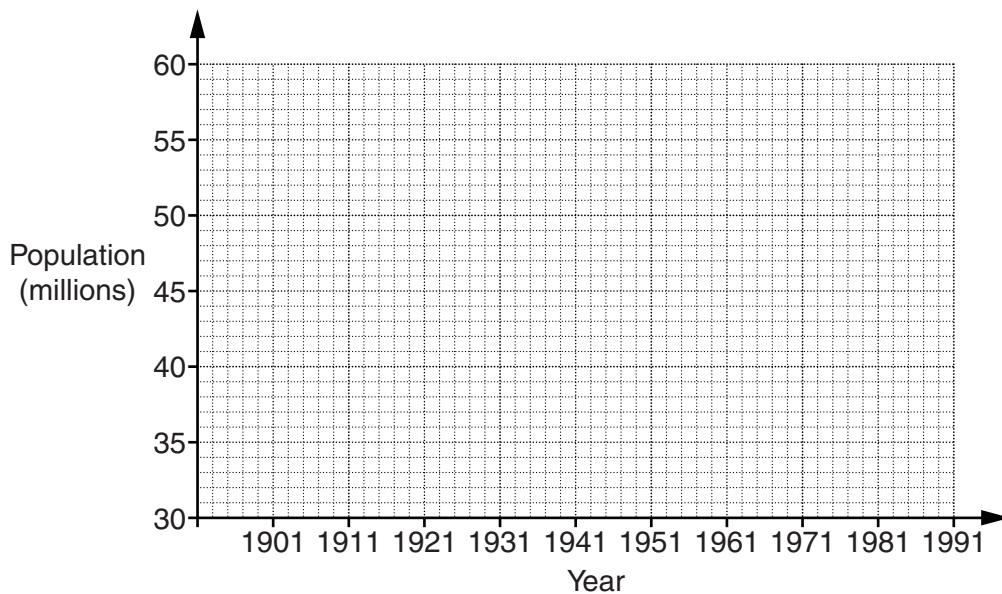
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[1]

- (b) Draw a time series graph to show the population of the **United Kingdom** from 1901 to 1991.



[2]

- (c) Describe the trend shown by your graph.

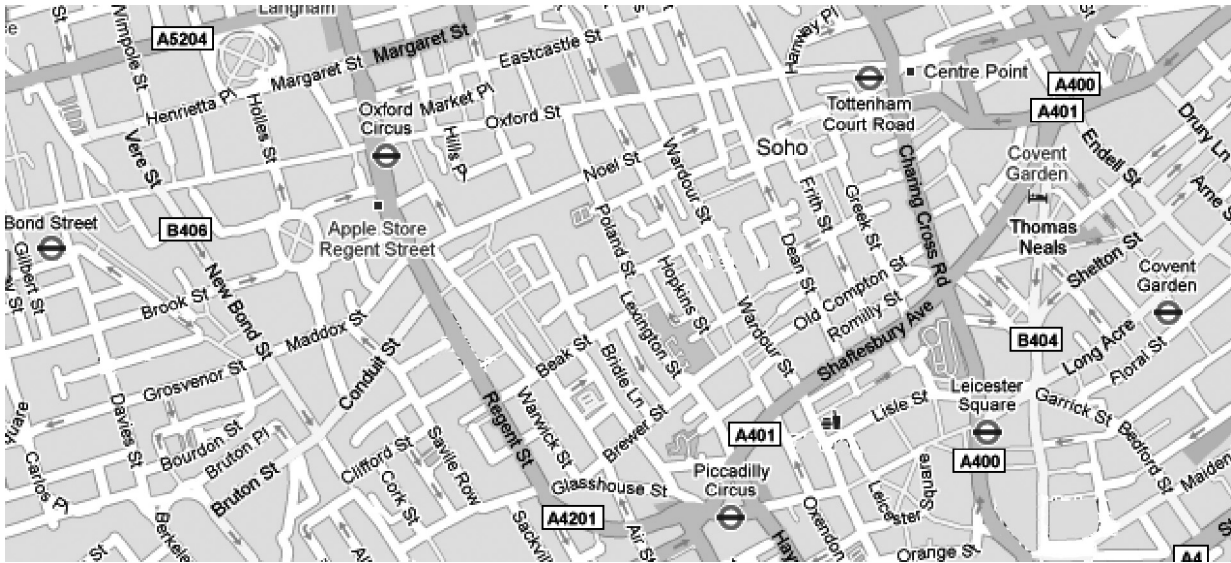
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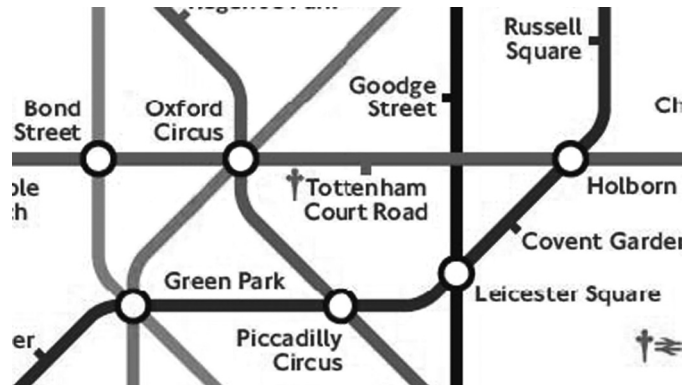
[1]

18 Here is a street map of an area in central London.  
It is drawn to scale.



Key:  underground station

Here is part of the map for the London Underground.  
It shows the underground lines that link the stations shown in the first map.



Is the London Underground Tube map drawn to scale?  
Use measurements to justify your answer.

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[4]

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