

Write your name here

Surname

Other names

Pearson Edexcel
Level 1 / Level 2
GCSE (9–1)

Centre Number

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Candidate Number

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Mathematics

Paper 3 (Calculator)

Foundation Tier

Tuesday 13 June 2017 – Morning

Time: 1 hour 30 minutes

Paper Reference

1MA1/3F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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P 5 0 5 4 8 A 0 1 2 0



Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows the lengths of five rivers.

River	Length (km)
Trent	297 ✓
Don	112 ✓
Severn	354 ✓
Thames	346 ✓
Mersey	113 ✓

(a) Write down the rivers in order of length.

Start with the shortest river.

Don, Mersey, Trent, Thames, Severn

(1)

Ami says,

“The River Thames is more than three times as long as the River Don.”

(b) Show that Ami is correct.

River Don = 112 km Three times this length is 336 km

$$\begin{array}{r} 112 \\ \times 3 \\ \hline 336 \end{array}$$

which is less than 346 km, the length of the river Thames.

(1)

(Total for Question 1 is 2 marks)



2 Cups are sold in packs and in boxes.

There are 12 cups in each pack.

There are 18 cups in each box.

Alison buys p packs of cups and b boxes of cups.

Write down an expression, in terms of p and b , for the total number of cups Alison buys.

$$12p + 18b$$

(Total for Question 2 is 2 marks)

3 Here are four digits.

5 6 1 9

(i) Write down the smallest possible two digit number that can be made with two of the digits.

$$15$$

(1)

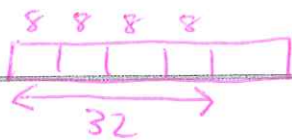
(ii) Write down the three digit number closest to 200 that can be made with three of the digits.

$$196$$

(1)

(Total for Question 3 is 2 marks)





4 $\frac{4}{5}$ of a number is 32

Find the number.

$$\begin{aligned} \frac{4}{5} \text{ of } x &= 32 \\ \frac{4}{5} \times x &= 32 \\ x &= \frac{32}{1} \div \frac{4}{5} \end{aligned}$$

$$\begin{aligned} x &= \frac{32}{1} \times \frac{5}{4} \\ &= 40 \end{aligned}$$

40

(Total for Question 4 is 2 marks)

5 A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

(a) Write down the ratio of white tiles to grey tiles.

$$\begin{aligned} \text{white} &: \text{grey} \\ \frac{1}{4} &: \frac{3}{4} \end{aligned}$$

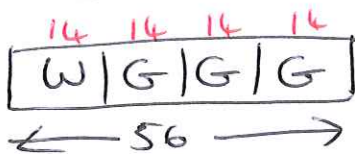
1 : 3
(1)

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

$$\begin{aligned} \text{White} &: \text{grey} \\ 1 &: 3 \end{aligned}$$

$$\begin{aligned} \text{Grey} &= 3 \times 14 \\ &= 42 \end{aligned}$$



42
(2)

(Total for Question 5 is 3 marks)

$$4 \overline{) 56} \begin{array}{r} 14 \\ \underline{4} \\ 16 \\ \underline{16} \\ 0 \end{array}$$

$$\begin{array}{r} 14 \\ \times 3 \\ \hline 42 \\ \hline \end{array}$$



DO NOT WRITE IN THIS AREA

6 Here is a list of numbers.

12 15 14 17 22 19 13

Bridgit says,

“To work out the median you find the middle number,
so the median of these numbers is 17”

Bridgit’s answer is **not** correct.

(a) What is wrong with Bridgit’s method?

Bridgit should have put the numbers in order,
smallest to biggest, before finding the middle number
(1)

(b) Work out the range of the numbers in the list.

$$\begin{aligned} \text{Range} &= \text{biggest} - \text{smallest} \\ &= 22 - 12 \\ &= 10 \end{aligned}$$

$$\begin{array}{r} 10 \\ \hline (2) \end{array}$$

(c) Work out the mean of the numbers in the list.

$$\text{mean} = \frac{12 + 15 + 14 + 17 + 22 + 19 + 13}{7}$$

$$= \frac{112}{7}$$

$$= 16$$

$$\begin{array}{r} 30 \\ 48 \\ 34 \\ \hline 112 \\ 1 \\ \hline 16 \end{array} \quad (2)$$

(Total for Question 6 is 5 marks)

$$\begin{array}{r} 16 \\ 7 \overline{) 112} \end{array}$$

- 7 Priti is going to have a meal.
She can choose one starter and one main course from the menu.

Menu	
Starter	Main Course
Salad	Pasta
Fish	Rice
Melon	Burger

Write down all the possible combinations Priti can choose.

Salad + Pasta Fish + Pasta Melon + Pasta
Salad + Rice Fish + Rice Melon + Rice
Salad + Burger Fish + Burger Melon + Burger

(Total for Question 7 is 2 marks)

- 8 Joanne wants to buy a dishwasher.

The dishwasher costs £372

Joanne will pay a deposit of £36

She will then pay the rest of the cost in 4 equal monthly payments.

How much is each monthly payment?

$$\begin{aligned} & \text{cost} - \text{deposit} \\ & = 372 - 36 \\ & = £336 \end{aligned}$$

$$\begin{aligned} \text{monthly payment} & = £336 \div 4 \\ & = £84 \end{aligned}$$

£ 84

(Total for Question 8 is 2 marks)



9 Davos is a cleaner.

The table shows information about the time it will take him to clean each of four rooms in a house.

Room	Time
Kitchen	2 hours
Sitting room	1 hour 40 minutes
Bedroom	$1\frac{1}{2}$ hours
Bathroom	45 minutes

Breaks

75 minutes

Davos wants to clean all four rooms in one day.
He will have breaks for a total time of 75 minutes.

7 hrs 10 mins total time

Davos is going to start cleaning at 9 am.

Will he finish cleaning by 4 pm?
You must show all your working.

Start 9 am

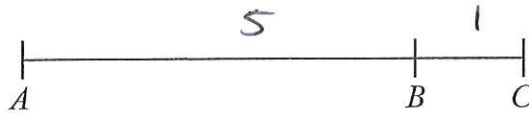
Finish 4.10 pm

No. Davos will not finish by 4 pm. He will finish at 4.10 pm.

(Total for Question 9 is 3 marks)



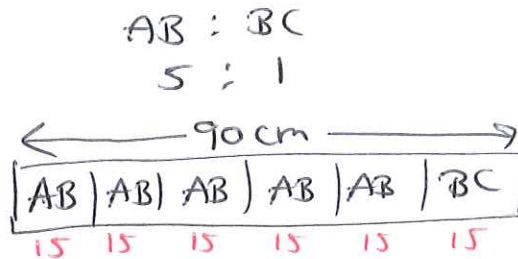
10 ABC is a straight line.



The length AB is five times the length BC .

$AC = 90$ cm.

Work out the length AB .



$$AB = 5 \times 15$$

..... 75 cm

(Total for Question 10 is 3 marks)

11 $T = 4v + 3$

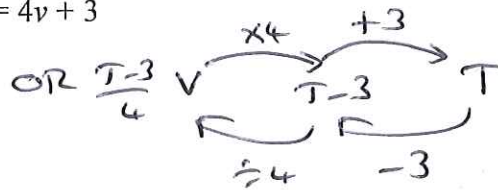
(a) Work out the value of T when $v = 2$

$$\begin{aligned} T &= 4 \times 2 + 3 \\ &= 8 + 3 \\ &= 11 \end{aligned}$$

$T =$ 11
(2)

(b) Make v the subject of the formula $T = 4v + 3$

$$\begin{aligned} T &= 4v + 3 & [-3] \\ T - 3 &= 4v & [\div 4] \\ \frac{T - 3}{4} &= v \end{aligned}$$

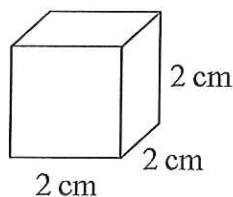


$v = \frac{T - 3}{4}$
(2)

(Total for Question 11 is 4 marks)



12 The diagram shows a cube of side length 2 cm.



Vera says,

“The volume of any solid made with 6 of these cubes is 48 cm^3 ”

(a) Is Vera correct?

You must show your working.

$$\begin{aligned} \text{Volume cube} &= 2 \times 2 \times 2 \\ &= 8 \text{ cm}^3 \end{aligned}$$

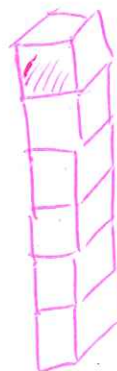
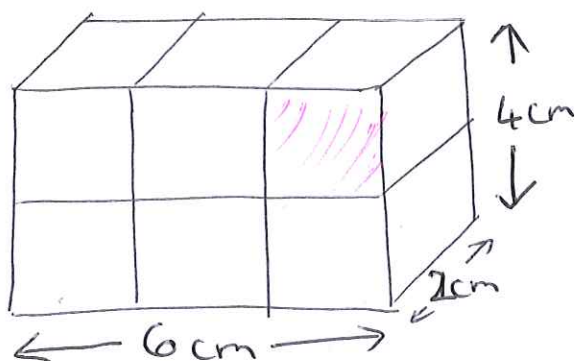
$$\begin{aligned} 6 \text{ cubes} &= 6 \times 8 \\ &= 48 \text{ cm}^3 \end{aligned}$$

Yes, Vera is correct.

(2)

(b) (i) Draw a cuboid that can be made with 6 of these cubes.

Write the dimensions of the cuboid on your diagram.



(1)

(ii) Work out the surface area of your cuboid.

$$\begin{aligned} \text{front + back faces} &= 2 \times (6 \times 4) = 48 \text{ cm}^2 \\ \text{left + right faces} &= 2 \times (2 \times 4) = 16 \text{ cm}^2 \\ \text{top + bottom faces} &= 2 \times (6 \times 2) = 24 \text{ cm}^2 + \\ &= \underline{88 \text{ cm}^2} \end{aligned}$$

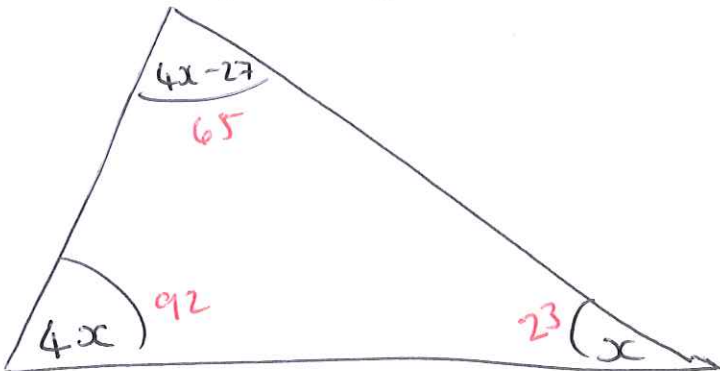
88 cm²

(2)

(Total for Question 12 is 5 marks)

- 13 The size of the largest angle in a triangle is 4 times the size of the smallest angle.
The other angle is 27° less than the largest angle.

Work out, in degrees, the size of each angle in the triangle.
You must show your working.



$$4x - 27 + 4x + x = 180$$

$$9x - 27 = 180 \quad [+27]$$

$$9x = 207 \quad [\div 9]$$

$$x = 23^\circ$$

$$23^\circ, 65^\circ, 92^\circ$$

largest angle

$$= 4x - 27$$

$$= 4 \times 23 - 27$$

$$= 65^\circ$$

$$\text{smallest angle} = 23^\circ$$

third angle

$$= 4x$$

$$= 4 \times 23$$

$$= 92^\circ$$

(Total for Question 13 is 5 marks)

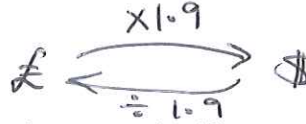


14 Andy went on holiday to Canada.
His flights cost a total of £1500

Andy stayed for 14 nights.
His hotel room cost \$196 per night.

Andy used wifi for 12 days.
Wifi cost \$5 per day.

The exchange rate was \$1.90 to £1



(a) Work out the total cost of the flights, the hotel room and wifi.
Give your answer in pounds.

Costs in pounds

Flights £1500

$$\begin{aligned} \text{Hotel room per night} &= \$196 \div 1.9 = \text{£}103.1578947 \\ &\times 14 \text{ nights} \\ &= \text{£}1444.21 \\ &\text{to nearest penny} \end{aligned}$$

$$\begin{aligned} \text{Wifi cost per day} &= \$5 \div 1.9 = \text{£}2.631578947 \\ &\times 12 \text{ days} \\ &= \text{£}31.58 \text{ to nearest penny} \end{aligned}$$

$$\begin{aligned} \text{Total Cost} &= \\ &\text{£ } 2975.79 \\ &\text{(5)} \end{aligned}$$

(b) If there were fewer dollars to £1, what effect would this have on the total cost, in pounds, of Andy's holiday?

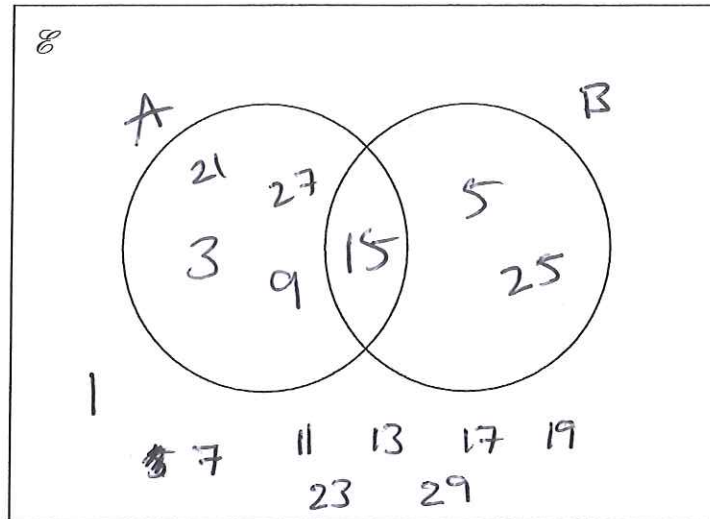
Andy's holiday would be more expensive. (1)

(Total for Question 14 is 6 marks)



15 $\mathcal{E} = \{\text{odd numbers less than } 30\} = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29\}$
 $A = \{3, 9, 15, 21, 27\}$
 $B = \{5, 15, 25\}$

(a) Complete the Venn diagram to represent this information.



(4)

A number is chosen at random from the universal set, \mathcal{E} .

(b) What is the probability that the number is in the set $A \cup B$?

$$\frac{7}{15}$$

(2)

(Total for Question 15 is 6 marks)



16 Solve the simultaneous equations

$$\begin{cases} 3x + y = -4 & \textcircled{1} \\ 3x - 4y = 6 & \textcircled{2} \end{cases}$$

$$\begin{cases} \textcircled{1} \times 4: 12x + 4y = -16 & \textcircled{3} \\ \textcircled{2} \times 1: 3x - 4y = 6 & \textcircled{4} \end{cases}$$

$\textcircled{\text{DASS}}$

$$\begin{aligned} \textcircled{3} + \textcircled{4}: 15x &= -10 \\ x &= \frac{-10}{15} \\ x &= -\frac{2}{3} \end{aligned}$$

Subs x in $\textcircled{1}$

$$3x - \frac{2}{3} + y = -4$$

$$\begin{aligned} -2 + y &= -4 & [+2] \\ y &= -2 \end{aligned}$$

$$x = -\frac{2}{3}$$

$$y = -2$$

(Total for Question 16 is 3 marks)



17 The table shows some information about the dress sizes of 25 women.

Dress size	Number of women
8	2
10	9
12	8
14	6

25

(a) Find the median dress size.

8 8 10 10 10 10 10 10 10 10 10 10 12 (12) 12 12 12 12 12 12 14 14 14 14 14 14

$n = 25$ median is 13th value

$$\frac{n+1}{2} = 13$$

12

(1)

3 of the 25 women have a shoe size of 7

Zoe says that if you choose at random one of the 25 women, the probability that she has either a shoe size of 7 or a dress size of 14 is $\frac{9}{25}$ because

$$\frac{3}{25} + \frac{6}{25} = \frac{9}{25}$$

(b) Is Zoe correct?

You must give a reason for your answer.

No. Anyone with shoe size 7 AND dress size 14 will have been

included twice in Zoe's calculation

(1)

(Total for Question 17 is 2 marks)



18 Daniel bakes 420 cakes.

He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

L:C

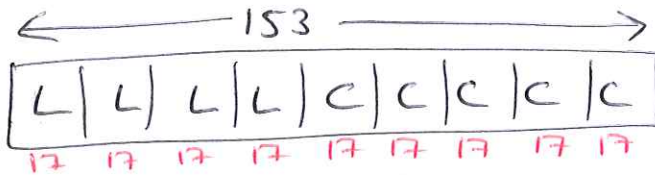
The ratio of the number of lemon cakes to the number of chocolate cakes is 4:5

Work out the number of lemon cakes Daniel bakes.

Vanilla $\frac{2}{7}$ of 420 = 120

Banana 35% of 420 = 147

Lemon + Chocolate $420 - 147 - 120 = 153$

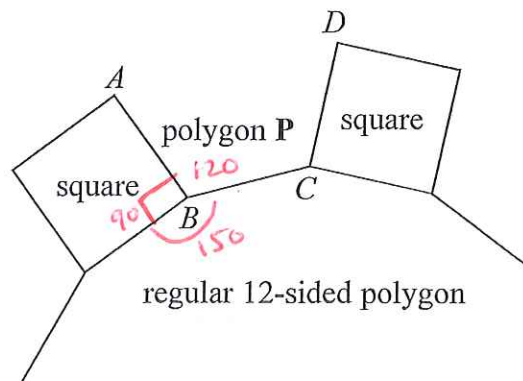


Lemon = 4×17
= 68 cakes

68

(Total for Question 18 is 5 marks)

19 In the diagram, AB , BC and CD are three sides of a regular polygon P .



Show that polygon P is a hexagon.
You must show your working.

Interior angle of square = 90°

Interior angle of regular 12-sided polygon

$$= \frac{(n-2) \times 180}{n}$$

$$= \frac{(12-2) \times 180}{12}$$

$$= \frac{10 \times 180}{12}$$

$$= 150^\circ$$

Angles @ at point add up to 360°

$$90^\circ + 150^\circ = 240^\circ$$

$$360^\circ - 240^\circ = 120^\circ$$

Interior angle of a hexagon ($n=6$)

$$= \frac{(6-2) \times 180}{6}$$

$$= \frac{4 \times 180}{6}$$

$$= 120^\circ$$

Polygon P is a hexagon because $120^\circ + 150^\circ + 90^\circ = 360^\circ$

(Total for Question 19 is 4 marks)



20 The density of apple juice is 1.05 grams per cm^3 .

The density of fruit syrup is 1.4 grams per cm^3 .

The density of carbonated water is 0.99 grams per cm^3 .

25 cm^3 of apple juice are mixed with 15 cm^3 of fruit syrup and 280 cm^3 of carbonated water to make a drink with a volume of 320 cm^3 .

Work out the density of the drink.

Give your answer correct to 2 decimal places.

D M V

Apple Juice

$$D = 1.05 \text{ g/cm}^3$$

$$M = 26.25 \text{ g}$$

$$V = 25 \text{ cm}^3$$

$$m = D \times V$$

Fruit Syrup

$$D = 1.4 \text{ g/cm}^3$$

$$M = 21 \text{ g}$$

$$V = 15 \text{ cm}^3$$

Carb. Water

$$D = 0.99 \text{ g/cm}^3$$

$$M = 277.2 \text{ g}$$

$$V = 280 \text{ cm}^3$$

DRINK

$$D = ?$$

$$M = 324.45 \text{ g}$$

$$V = 320 \text{ cm}^3$$

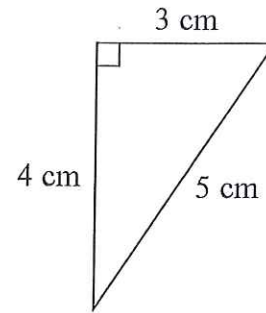
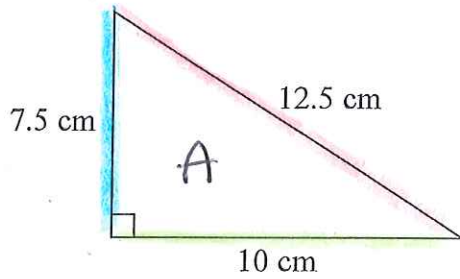
$$D = \frac{M}{V} = \frac{324.45}{320} = 1.01390625$$

$$\dots\dots\dots 1.01 \text{ g/cm}^3$$

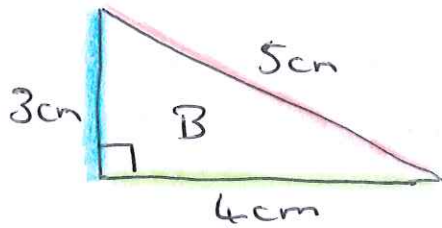
(Total for Question 20 is 4 marks)



21



Show that these two triangles are mathematically similar.



$$10 \div 4 = 2.5$$

$$12.5 \div 5 = 2.5$$

$$7.5 \div 3 = 2.5$$

Triangle A is an enlargement of Triangle B with Scale Factor 2.5

(Total for Question 21 is 2 marks)

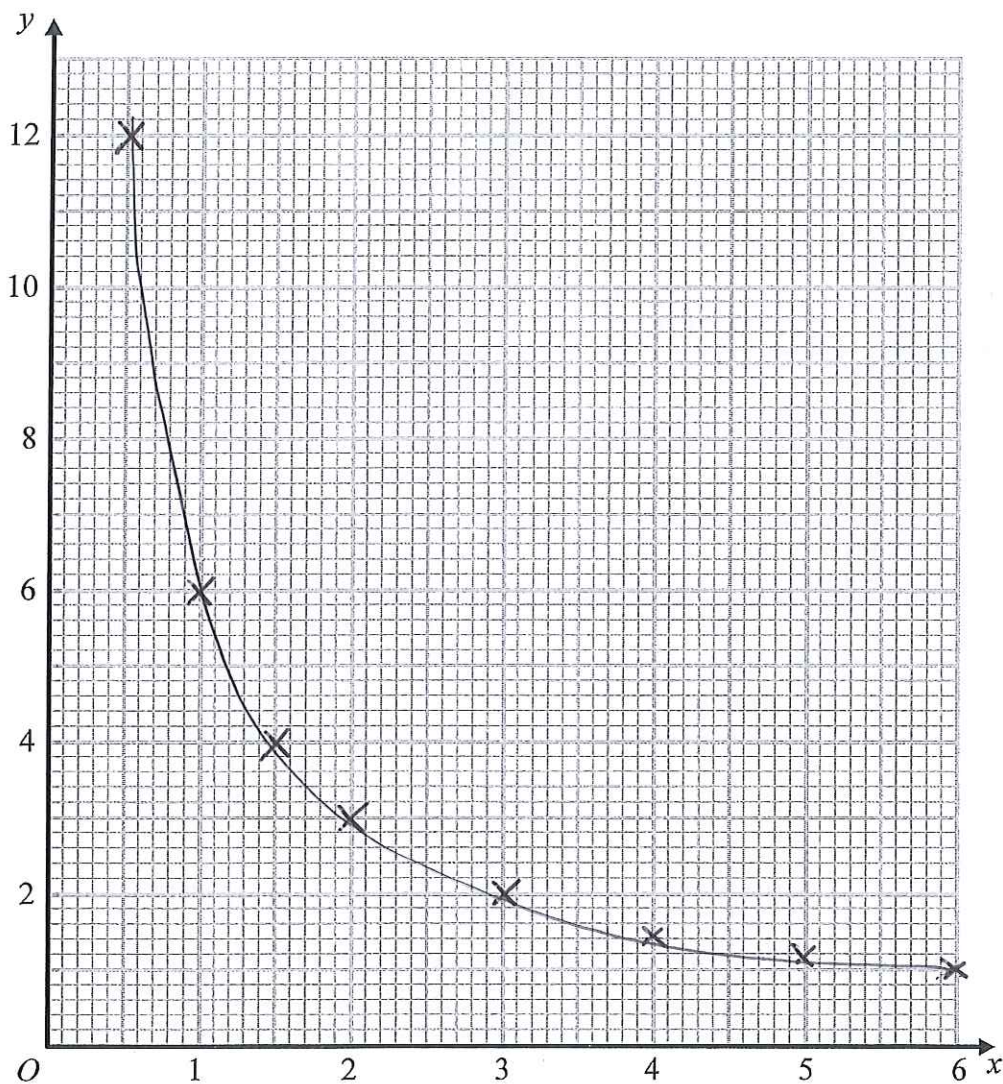


22 (a) Complete the table of values for $y = \frac{6}{x}$

x	0.5	1	1.5	2	3	4	5	6
y	12	6	4	3	2	1.5	1.2	1

(2)

(b) On the grid below, draw the graph of $y = \frac{6}{x}$ for values of x from 0.5 to 6



(2)

(Total for Question 22 is 4 marks)



23 Harley's house has a value of £160 000 correct to 2 significant figures.

(a) (i) Write down the least possible value of the house.

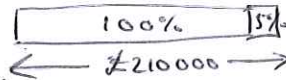
£ 155 000
(1)

(ii) Write down the greatest possible value of the house.

£ 165 000
(1)

The value of Rita's house increased by 5%.

Her house then had a value of £210 000



(b) Work out the value of Rita's house before the increase.

$$\begin{array}{l} 105\% : £210\,000 \\ \div 105 \downarrow \\ 1\% : £2000 \\ \downarrow \div 105 \\ \times 100 \downarrow \\ 100\% : £200\,000 \end{array}$$

£ 200 000
(2)

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

