Write your name here

Surname	Other names
MODEL ANSWERS	

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

Centre Number | Candidate Number

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 ▶

P50548A

6/6/6/6/6/6/7/7/4/

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.

3x River Don length = 3x112 = 336 km. Thames (346) is longer than 3x River Don length (336).

(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.

12 x no. of packs + 18 x no. of boxes.

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.

⇒ 1 is the smallest number, so use 1 in the 10s column.
⇒ 5 is the next smallest number so use 5 in the units column.

15

(1)

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

It is the closest possible (4) number.

196

(1)

(Total for Question 3 is 2 marks)

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

Find the number.

Do the opposite operations

$\frac{32}{4} = 8$

$8 \times 5 = 40$

Alternatively

$x \times \frac{4}{5} = 32$

$x = 32 \times \frac{5}{4} = 40$

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.

$\frac{1}{4}$ are white and $\frac{3}{4}$ are grey.

$\frac{1}{4} : \frac{3}{4}$

1:3

(1)

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

$\frac{3}{4} \times 56 = 42$ $\frac{3}{4}$ of 56 tiles are grey.

42

(2)

(Total for Question 5 is 3 marks)

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?

You should arrange the numbers in ascending order.

(1)

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

Range = largest - smallest

= 22 - 12

= 10

10

(2)

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

Mean = $\frac{\text{Sum of all numbers}}{\text{Amount of numbers}}$

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

$= \frac{112}{7}$

16

(2)

(Total for Question 6 is 5 marks)

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?

£372 - £36 = £336 Total left to payment

$\frac{£336}{4} = £84$

£ 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

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

Davos is going to start cleaning at 9 am.

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

2hrs = 2x60 = 120 min

1hr 40 min = 1x60+40 = 100 min

$1\frac{1}{2}$ hr = $1\frac{1}{2} \times 60 = \frac{3}{2} \times 60 = 90$ min

} convert hours to minutes

Total time = 120+100+90+45 = 355
before breaks

Total time = 355+75 = 430 min

→ hrs: $\frac{420}{6} = 7$ min: 430−420 = 10

9 am + 7 hr 10 min

= 4:10 pm > 4pm. ∴ Davos will not finish.

(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 : BC

5 : 1

6

$\frac{90}{5+1} \times 5 = 75$

6

75 cm

(Total for Question 10 is 3 marks)

11 $T = 4v + 3$

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

$T = 4(2) + 3$

$= 8 + 3$

$T =$ 11

(2)

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

$T = 4v + 3$

$-3 \quad -3$

$T - 3 = 4v$

$\div 4$

$v = \frac{T-3}{4}$

$\frac{T-3}{4}$

(2)

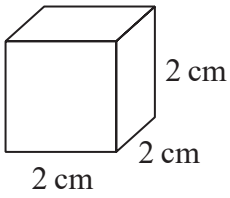
(Total for Question 11 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

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.

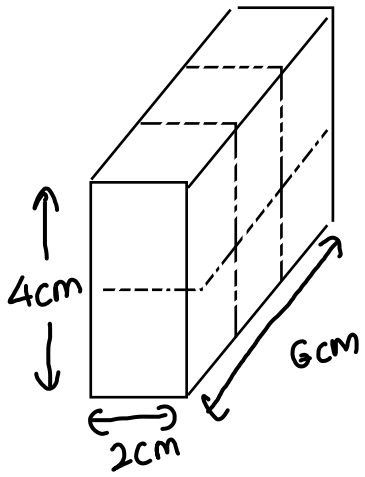
Volume of 1 cube = $l \times b \times h$
$= 2 \times 2 \times 2 = 8\text{cm}^3$

volume of 6 cubes $= 8 \times 6$
$= 48\text{cm}^3$

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.

Either sides ↘ ↙ Top and below.

$2(4 \times 2) + 2(4 \times 6) + 2(2 \times 6)$

↗ front and back

$2(8) + 2(24) + 2(12)$

$16 + 48 + 24$

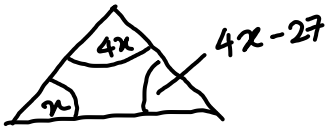
88 cm^2

(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.



$x + 4x + (4x-27) = 180$ (Angles in a Δ)

$9x - 27 = 180$ $+27$

$9x = 207$ $\div 9$

$x = \frac{207}{9}$

$x = 23$

Smallest angle $= x^0$ ⇒ x is unknown

Largest angle $= 4x^0$ ⇒ Largest angle is 4x smallest

other angle $= 4x^0 - 27^0$ ⇒ other angle = largest -27^0.

Smallest $= x^0 = 23^0$

Largest $= 4x^0 = 4 \times 23^0 = 92^0$

Other $= 4x^0 - 27 = 92^0 - 27$
$= 65^0$

23 °, 92 °, 65 °

(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.

$1.90 : £1.00

Hotel = $14 \times \frac{196}{1.90} = £1444.210$

Wifi = $12 \times \frac{5}{1.90} = £31.578$

} divide $ amount by 1.90 to convert to pounds

Total = £1500 + 1444.210 + 31.578

= £2975.788 ≈ £2975.79

£ 2975.79

(5)

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

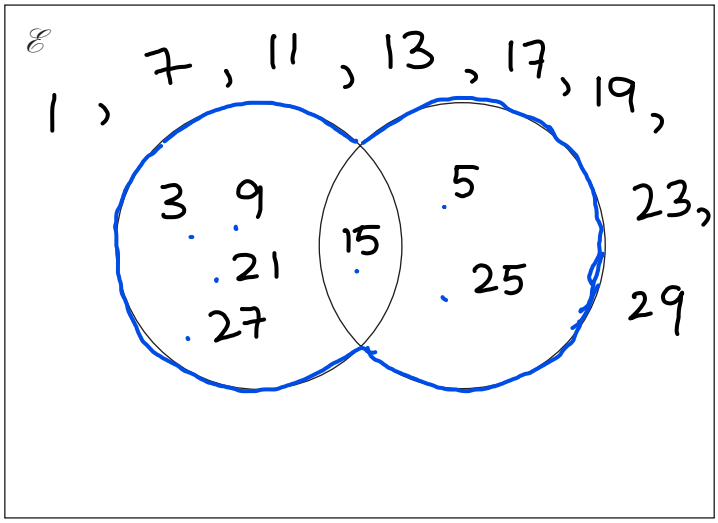
The total cost in pounds will increase.
£ is less valuable because £1 can buy fewer dollars

(1)

(Total for Question 14 is 6 marks)

15 $\mathscr{E}$ = {odd numbers less than 30}
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, $\mathscr{E}$.

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

Total = 15 numbers

AUB means A union B. Includes all numbers in A and B (outlined in blue).

$\frac{7}{15}$

(2)

(Total for Question 15 is 6 marks)

16 Solve the simultaneous equations

$$3x + y = -4 \quad (1)$$
$$3x - 4y = 6 \quad (2)$$

(1) − (2)

$$3x + y = -4$$
$$-3x - 4y = 6$$

$$y - (-4y) = -4 - 6$$
$$y + 4y = -10$$
$$5y = -10$$
$$y = -2$$

Subs $y = -2$ in (1)

$$3(x) + (-2) = -4$$
$$3x - 2 = -4 \quad (+2)$$
$$3x = -2 \quad (\div 3)$$
$$x = \frac{-2}{3}$$

$x =$ $-2/3$

$y =$ -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	cumulative
8	2	2
10	9	11
12	8	19
14	6	25

(a) Find the median dress size.

Total women = 2+9+8+6 = 25

Median = $\frac{n+1}{2}$ th = $\frac{25+1}{2}$ = 13th women

The 13th woman falls in size 12.

Alternatively

25

12 — 12

↑ 13th woman

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.

Zoe is incorrect because shoe size and clothes size are not mutually exclusive.

ie: A woman can be both size 14 and have size 7 feet.

(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.

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 = $\frac{2}{7} \times 420 = 120$

Banana = $420 \times \frac{35}{100} = 147$

$\therefore$ lemon or chocolate $= 420 - (120 + 147) = 420 - 267$

$= 153$

Lemon : Chocolate

4 : 5 } $\frac{153}{4+5} \times 4 = 68$ lemon cakes

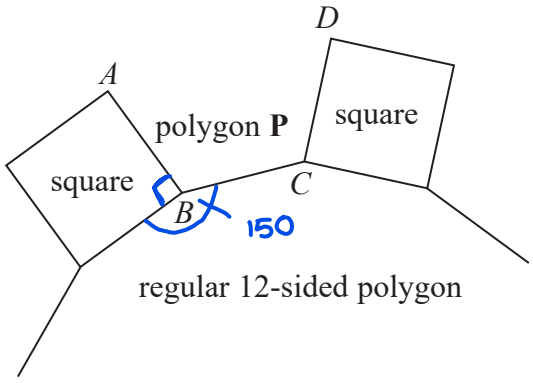
Lemon ratio

Total parts

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.

Σ Interior angle of 12-sided polygon $= (12-2)\,180$

$= 10 \times 180 = 1800^\circ$

One Interior angle of 12-sided polygon $= \frac{1800}{12} = 150^\circ$

Size of Interior angle of polygon P. $= 360^\circ - 150^\circ - 90^\circ$

$= 120^\circ$

90° is the interior angle of a square

$120 \times$ no. of sides of polygon P $= (\text{no. of sides} - 2) \times 180$

$\div 180$

$\frac{2}{3} \times \text{no. of sides} = \text{no. of sides} - 2$

$2 = \left(1 - \frac{2}{3}\right) \text{no. of sides}$

$2 = \frac{1}{3} \times \text{no. of sides}$

$\text{no. of sides} = 2 \times 3$

$= 6$ sides is hexagon

(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.

density = $\frac{\text{mass}}{\text{volume}}$.

Mass of apple juice: $1.05 \times 25 = 26.25$

Mass of fruit syrup: $1.4 \times 15 = 21$

Mass of carbonated water: $0.99 \times 280 = 277.2$

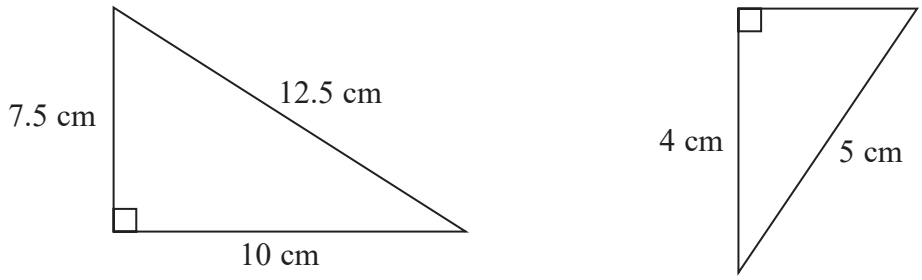
Total mass = 324.45g

density = $\frac{324.45}{320} = 1.013 \approx 1.01 \text{ g/cm}^3$

1.01 ..... g/cm^3

(Total for Question 20 is 4 marks)

21



Show that these two triangles are mathematically similar.

$7.5 = 2.5 \times 3$

$12.5 = 2.5 \times 5$

$10 = 2.5 \times 4$

} all the sides are related by a scale factor of 2.5.

The bigger triangle is the smaller triangle multiplied by a scale factor of 2.5.

∴ They are similar.

(Total for Question 21 is 2 marks)

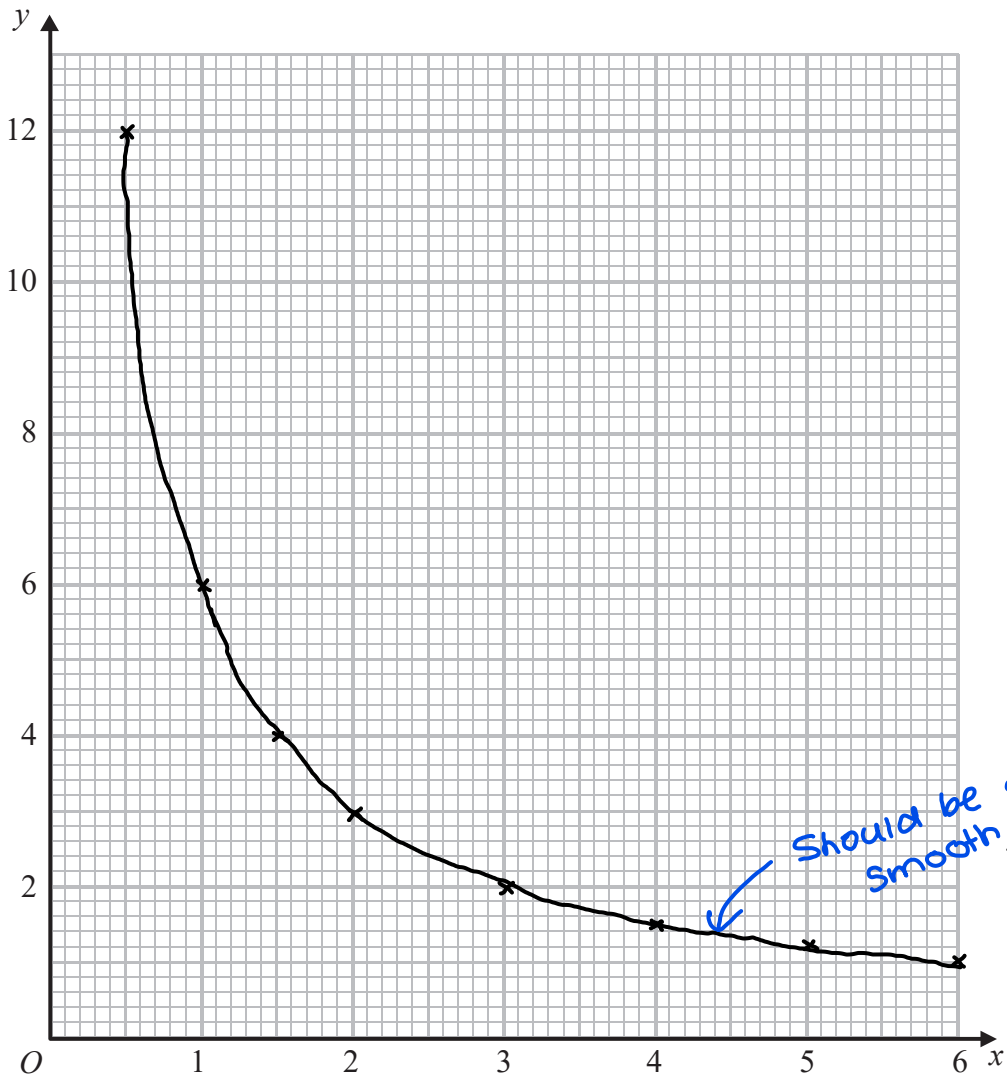
22 (a) Complete the table of values for $y = \frac{6}{x}$

$y = \frac{6}{0.5} = 12$ $\frac{6}{1.5} = 4$ $\frac{6}{3} = 2$ $\frac{6}{5} = 1.2$ $\frac{6}{6} = 1$

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.

This rounds up to £160,000 as 3rd sf is ⩾5

£ 155000

(1)

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

This rounds down to £160,000 as 3rd sf is < 5.

£ 164999

(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.

As this is a increase, 100% + 5% = 105%.

105% ⟶ £210000

$$210000 \times \frac{100}{105} =$$

£ 200,000

(2)

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS