

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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.CG Maths.
Worked Solutions



Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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.

$$112 \times 3 = 336$$

The Thames is 346km and this is greater than 336km.

(1)

(Total for Question 1 is 2 marks)

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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.

p lots of 12 is the same as $p \times 12$, which is the same as $12p$.

b lots of 18 is the same as $b \times 18$, which is the same as $18b$.

Adding these expressions together gives the total number of cups

$$12p + 18b$$

(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.

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

Dividing by 4 finds $\frac{1}{5}$ of the number. Multiplying by 5 finds $\frac{5}{5}$ (all) of the number.

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.

There are 4 parts in total in the ratio. 1 part represents the white tiles, 3 must represent the grey tiles.

1:3

(1)

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

$$\frac{3}{4} \times 56$$

If $\frac{1}{4}$ are white, $\frac{3}{4}$ must be grey.

42

(2)

(Total for Question 5 is 3 marks)

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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?

The numbers need to be put in order first

(1)

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

22 - 12 Largest - smallest

10

(2)

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

12 + 15 + 14 + 17 + 22 + 19 + 13 / 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?

$$\begin{array}{r} 372 - 36 \\ \hline 4 \end{array}$$

This calculates how much she still has to pay after the deposit.

This spreads the remaining cost equally across the 4 months.

£ 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.

$$16 - 9 = 7$$

Converted 4pm to 16:00 and worked out the difference between this and 9:00. This calculates how many hours he has to do the cleaning.

$$4 \times 60 + 40 + 30 + 45 + 75 = 430$$

Adding the whole hours first and converting them into minutes. $2 + 1 + 1 = 4$ hours.

$\frac{1}{2}$ an hour.

Adding up all the times taken and the time for the break in minutes.

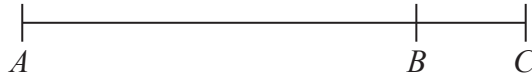
$$\frac{430}{60} = 7.1\bar{6}$$

430 minutes is more than 7 hours so he will not have enough time.

No

(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 .

$$\frac{90}{6} \times 5$$

The ratio $AB : BC$ is $5 : 1$
Dividing by 6 calculates the worth of
1 part then multiplying by 5 works
out the 5 parts which represents AB .

75

.....cm

(Total for Question 10 is 3 marks)

11 $T = 4v + 3$

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

$$4 \times 2 + 3$$

$$T = \frac{11}{(2)}$$

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

$$T - 3 = 4v$$

Subtract 3 from both sides then divide
both sides by 4 to get v on its own.

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

(2)

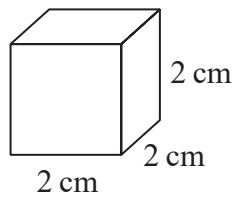
(Total for Question 11 is 4 marks)

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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.

$2^3 = 8$

Cubing one of the side lengths on a cube gives its volume.

$8 \times 6 = 48$

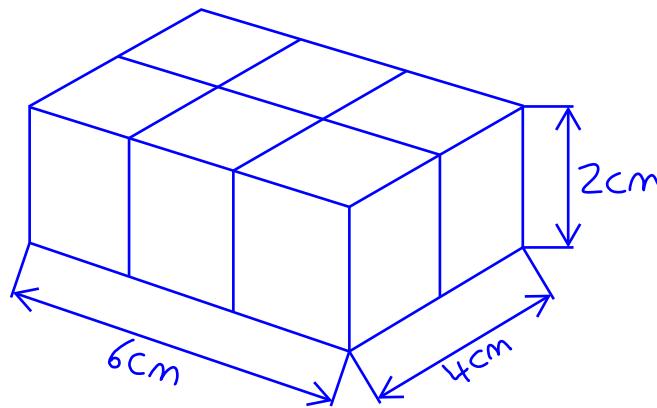
Any way the cubes are arranged will still have 6 times the volume of one of the cubes.

Yes

(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.

$2^2 = 4$

The area of one square face is 4 cm^2

4×22

There are 22 square faces.

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.

$$\underbrace{x}_{\text{Smallest angle.}} + \underbrace{4x}_{\text{Largest angle.}} + \underbrace{4x - 27}_{\text{Other angle.}} = 180$$

Let x be the smallest angle. Express all the angles algebraically then add them together. The sum is equal to 180 as there are this many degrees in a triangle.

$$9x = 180 + 27$$

Simplify the equation and solve x , which is the smallest angle.

$$x = \frac{207}{9} = 23$$

Now the other angles can be found.

$$4x = 4 \times 23 = 92$$

$$4x - 27 = 92 - 27$$

23 ° 92 ° 65 °

(Total for Question 13 is 5 marks)

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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.

$$14 \times 196 = 2744$$

The total cost in dollars for 14 nights in the hotel.

$$12 \times 5 = 60$$

The total cost in dollars for 12 days of Wifi.

$$2744 + 60 = 2804$$

The total cost in dollars for the hotel and Wifi.

$$\frac{2804}{1.90} = 1475.79$$

The total cost in pounds for the hotel and Wifi.

$$1475.79 + 1500$$

Adding the cost of the flights to give the overall cost.

£ 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?

It would cost more pounds

(1)

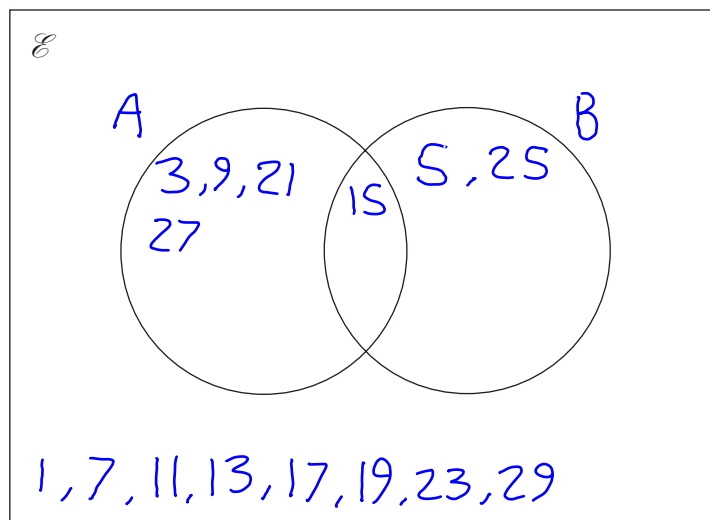
(Total for Question 14 is 6 marks)

15 $\mathcal{E} = \{\text{odd numbers less than } 30\}$

$A = \{3, 9, 15, 21, 27\}$

$B = \{5, 15, 25\}$

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



(4)

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

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

7 out of 15 numbers
are in A or B or both.

$\frac{7}{15}$

(2)

(Total for Question 15 is 6 marks)

16 Solve the simultaneous equations

$$\begin{aligned}3x + y &= -4 \\ 3x - 4y &= 6\end{aligned}$$

Eliminated the x terms by subtracting the second equation from the first equation.

$$\begin{aligned}5y &= -10 \\ y &= -2 \\ x &= \frac{-4 - (-2)}{3}\end{aligned}$$

Rearranged the first equation to make x the subject then substituted in -2 for y to solve x .

$$\begin{aligned}x &= \dots\dots\dots \frac{-2}{3} \\ y &= \dots\dots\dots -2\end{aligned}$$

(Total for Question 16 is 3 marks)

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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

(a) Find the median dress size.

$$\frac{25+1}{2} = 13$$

So the 13th value is the median,
which is in dress size 12.

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, the events aren't mutually exclusive.

Some of the women might have both
shoe size of 7 and dress size of 14.

(1)

(Total for Question 17 is 2 marks)

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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.

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

This calculates how many vanilla cakes there are.

$$0.35 \times 420 = 147$$

This calculates how many bannana cakes there are.

$$420 - 120 - 147 = 153$$

This calculates how many lemon and chocolate cakes there are.

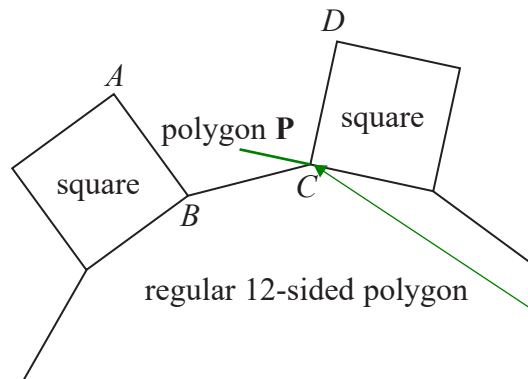
$$\frac{153}{9} \times 4$$

Dividing by 9 calculates 1 part of the ratio then multiplying by 4 calculates 4 parts, which represents the lemon 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.

$$\frac{360}{12} = 30$$

The exterior angle of the 12-sided polygon using the formula $360/\text{number of sides} = \text{exterior angle}$.

$$90 + 30 = 120$$

The exterior angle of the square is 90° and this is added to the exterior angle of the 12-sided polygon to get the interior angle of polygon P .

$$\frac{(6-2) \times 180}{6} = 120$$

The interior angle of a hexagon, which has 6 sides, is 120. Degrees in a polygon = $(n - 2) \times 180$, where n is the number of sides. Dividing the total number of degrees by the number of angles gives one of the angles.

(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.

$$d = \frac{m}{v}$$

$$m = dv$$

To work out the density, d , we need to work out the total mass, m , and divide this by the total volume, v . To work out the total mass, we need to add the mass of each of the liquids together.

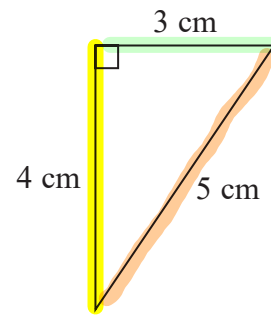
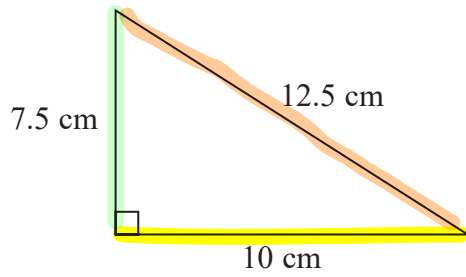
$$\frac{1.05 \times 25 + 1.4 \times 15 + 0.99 \times 280}{320}$$

Multiplying the density by the volume for each liquid then adding them together. Dividing by the total volume, 320 cm^3 .

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

(Total for Question 20 is 4 marks)

21



Show that these two triangles are mathematically similar.

$$\frac{10}{4} = 2.5$$

$$\frac{7.5}{3} = 2.5$$

$$\frac{12.5}{5} = 2.5$$

Therefore the triangles are similar
as all of the sides have been
enlarged by the same factor.

(Total for Question 21 is 2 marks)

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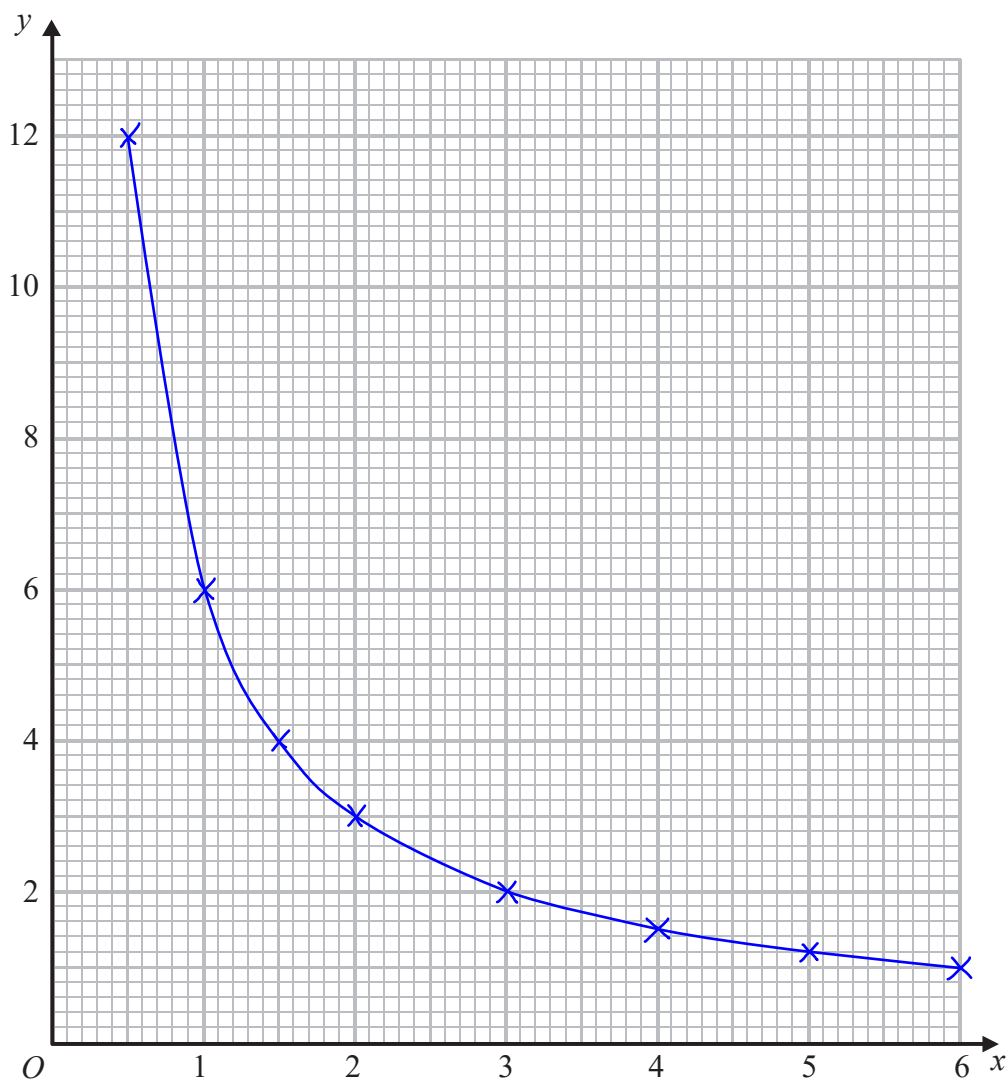
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22 (a) Complete the table of values for $y = \frac{6}{x}$

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.

£ 164,999.99
(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.

$$\frac{210000}{1.05}$$

Multiplying by 1.05 increases by 5% so dividing by 1.05 undoes this increase.

£ 200 000
(2)

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS