

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 1 (Non-Calculator)

Foundation Tier

Thursday 2 November 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference

1MA1/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.
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 not be used.**

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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6/6/7/2/

.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 (a) Change 365 cm into metres.

There are 100cm in 1m so dividing by 100 converts centimetres to metres. To divide by 100, move the decimal point twice to the left

3.65 m
(1)

- (b) Change 2.7 kg into grams.

There are 1000g in 1kg so multiplying by 1000 converts kilograms to grams. To multiply by 1000, move the decimal point three times to the right

2700 g
(1)

(Total for Question 1 is 2 marks)

- 2 Work out $2 + 7 \times 10$

BIDMAS so we need to multiply first. $7 \times 10 = 70$. Then $2 + 70 = 72$

72

(Total for Question 2 is 1 mark)

- 3 Solve $\frac{y}{4} = 10.5$

$$\begin{array}{r} 10.5 \\ \times \quad 4 \\ \hline 42.0 \end{array}$$

Multiply both sides by 4 to make y the subject

y = 42

(Total for Question 3 is 1 mark)

- 4 Here are four numbers.

-9 -2 2 9

Write one of these numbers in each box to make a correct calculation.

$$\boxed{-9} + \boxed{2} = -7$$

(Total for Question 4 is 1 mark)

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5 Here are the first four terms of a number sequence.

2 5 11 23

The rule to continue this sequence is

multiply the previous term by 2 and then add 1

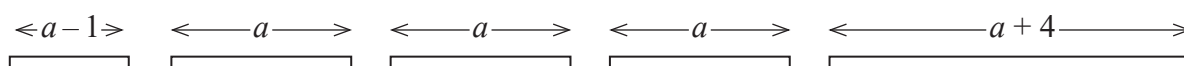
Work out the 5th term of this sequence.

$$\begin{aligned} 23 \times 2 &= 46 \\ 46 + 1 &= 47 \end{aligned}$$

47

(Total for Question 5 is 1 mark)

6 Here are five straight rods.



All measurements are in centimetres.

The total length of the five rods is L cm.

Find a formula for L in terms of a .

Write your formula as simply as possible.

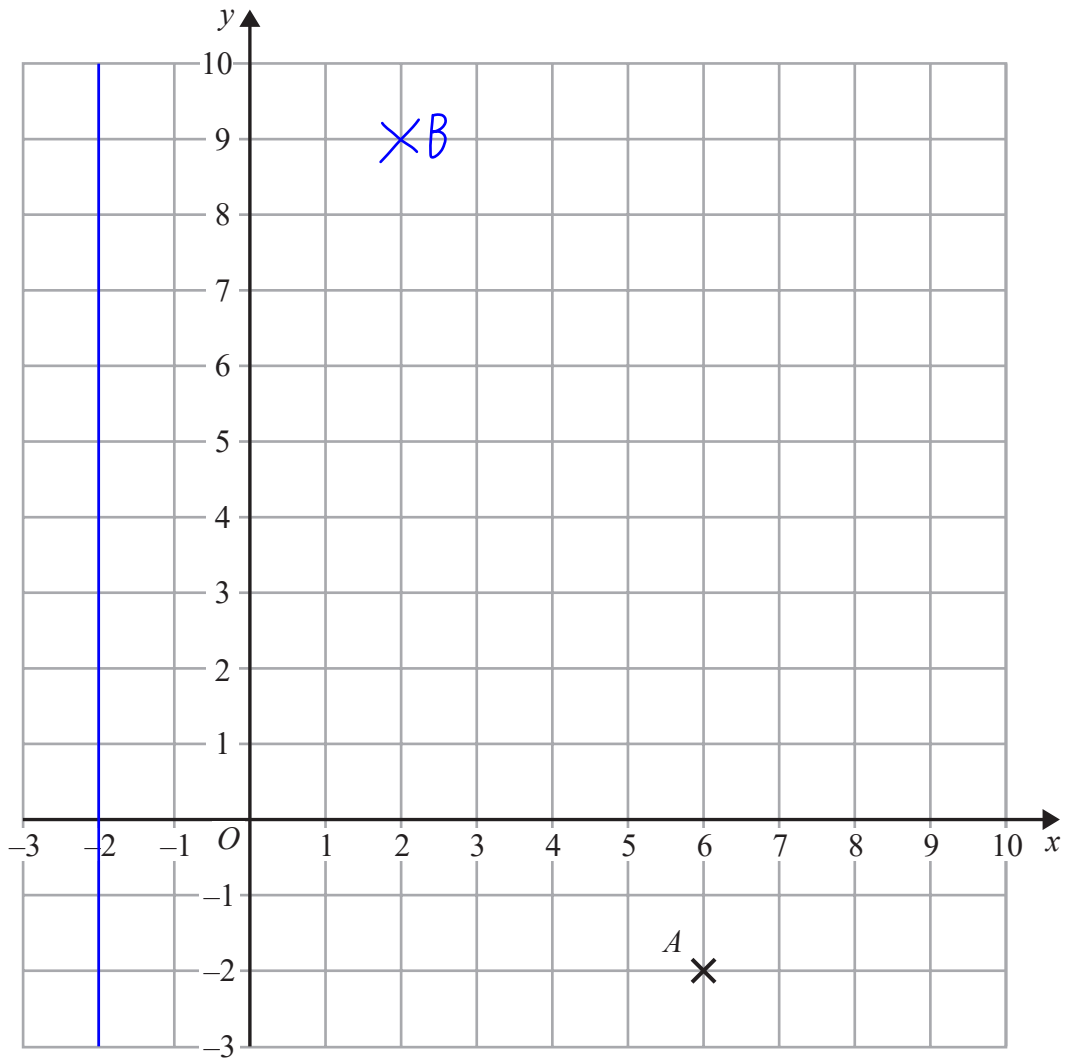
$$L = a - 1 + a + a + a + a + 4$$

Adding together all of the lengths of the rods. This is equal to the total length L

Collecting the like terms and simplifying

$$L = 5a + 3$$

(Total for Question 6 is 3 marks)



(a) Write down the coordinates of the point A .

(..... 6, -2)
(1)

- (b) (i) Plot the point with coordinates (2, 9).
Label this point B .

See previous page

(1)

- (ii) Does point B lie on the straight line with equation $y = 4x + 1$?
You must show how you get your answer.

$$4(2) + 1 = 9$$

Yes

Substituting in the x coordinate of 2 gives the correct y coordinate. The point satisfies the equation so it lies on the line

(1)

- (c) On the grid, draw the line with equation $x = -2$

See previous page

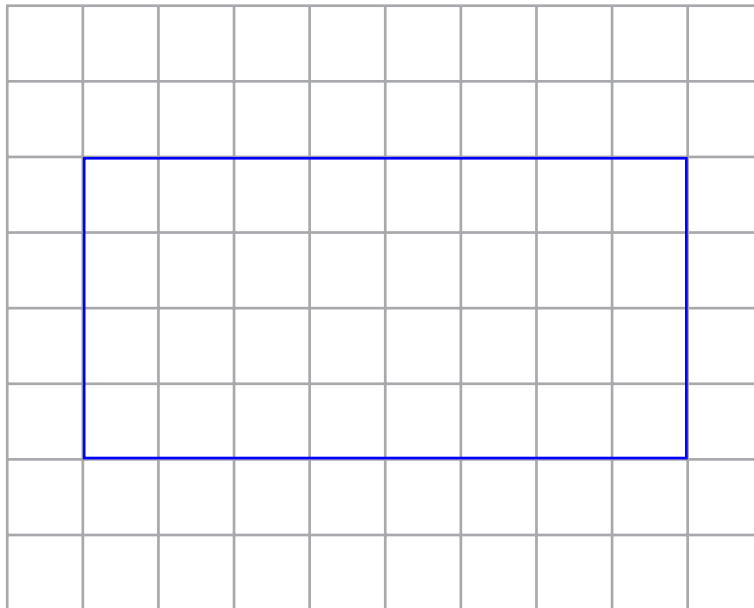
(1)

(Total for Question 7 is 4 marks)

- 8 The length of a rectangle is twice as long as the width of the rectangle.
The area of the rectangle is 32 cm^2 .

Draw the rectangle on the centimetre grid.

Area of rectangle = base \times height
Listing out the factor pairs of 32 until one of the pair is double the other gives 4 and 8. $4 \times 8 = 32$



(Total for Question 8 is 2 marks)

9 Jacqui wants to work out $3480 \div 5$

She knows that $3480 \div 10 = 348$

Jacqui writes $3480 \div 5 = 174$

because $10 \div 5 = 2$

and $348 \div 2 = 174$

What mistake did Jacqui make in her method?

She should have multiplied 348 by 2

Dividing by half the amount doubles the result

(Total for Question 9 is 1 mark)

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10 Jake and Sarah each played a computer game six times.

Their scores for each game are shown below.

Jake	10	9	8	11	12	8
Sarah	2	10	7	14	4	10

(a) Who had the most consistent scores, Jake or Sarah?
You must give a reason for your answer.

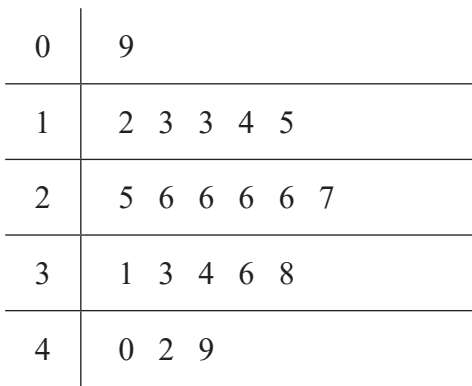
Jake as the range of his scores is lower

Range = largest - smallest
 Range of Jake = $12 - 8 = 4$
 Range of Sarah = $14 - 2 = 12$

(1)

Jake played a different game 20 times.

The stem and leaf diagram shows information about his scores.



Key
 1 | 2 represents 12 points

Jake said his modal score was 6 points because 6 occurs most often in the diagram.

(b) Is Jake correct?
You must explain your answer.

No. The mode is 26

$2|6 = 26$ so there are 4
 26s. There are no 6s

(1)

(Total for Question 10 is 2 marks)

- 11 There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.

(a) Work out the least number of adults needed in the nursery.

$$30 \div 8 = 3 \text{ r } 6$$

There are 3 lots of 8 children so 3 adults are needed for these. But there is a remainder of 6 children and an extra adult is needed for these

4

(2)

2 more children join the nursery.

- (b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

No as $32 \div 8 = 4$

There are now 4 lots of 8 children so 4 adults are needed for these. This is the same as was needed for 30

(1)

(Total for Question 11 is 3 marks)

- 12 Emma has 45 rabbits.

30 of the rabbits are male.

8 of the female rabbits have short hair.

12 of the rabbits with long hair are male.

(a) Use the information to complete the two-way table.

	Male	Female	Total
Long hair	12	7	19
Short hair	18	8	26
Total	30	15	45

(3)

One of Emma's rabbits is chosen at random.

(b) Write down the probability that this rabbit is a female with short hair.

8 out of the 45 rabbits are female with short hair

$$\frac{8}{45}$$

(1)

(Total for Question 12 is 4 marks)

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13 The total surface area of a cube is 294 cm^2 .

Work out the volume of the cube.

$$\begin{array}{r} 49 \\ 6 \overline{) 294} \end{array}$$

A cube has 6 square faces all with the same area. Dividing the total surface area by 6 works out the area of one of the square faces

$$\sqrt{49} = 7$$

Length squared = area of square
So the square root of the area gives the side length of the square

$$7^3$$

Length cubed = volume of cube
The side length of the square is the side length of the cube

$$\begin{array}{r} 49 \\ \times 7 \\ \hline 343 \end{array}$$

$$7^3 = 7 \times 7 \times 7 = 49 \times 7$$

..... 343 cm^3

(Total for Question 13 is 4 marks)

14 Here are two fractions.

$$\frac{7}{5}$$

$$\frac{5}{7}$$

Work out which of the fractions is closer to 1
You must show all your working.

$$\begin{array}{r} 1.4 \\ 5 \overline{) 7.0} \end{array}$$

Converting $7/5$ into a decimal gives 1.4. This is 0.4 away from 1

$$\begin{array}{r} 0.7 \\ 7 \overline{) 5.0} \end{array}$$

Converting $5/7$ into a decimal gives 0.7 something. There is no need to complete the division. This is less than 0.3 away from 1

$$\frac{5}{7}$$

0.4 is greater than 0.3 so $5/7$ is closer to 1

(Total for Question 14 is 3 marks)

- 15 There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7:4:9

Work out what percentage of the buttons in the jar are orange.

$$\frac{9 \times 5}{20 \times 5} = \frac{45}{100}$$

There are 20 parts in total in the ratio. 9 out of these are for orange. Percentage is out of 100 so converting the fraction so it has a denominator of 100 gives the percentage

..... 45 %

(Total for Question 15 is 2 marks)

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16 Berenika wants to buy 35 T-shirts.

Each T-shirt costs £5.80

Berenika does the calculation $40 \times 6 = 240$ to estimate the cost of 35 T-shirts.

(a) Explain how Berenika's calculation shows the actual cost will be less than £240

Both values have been over-estimated

(1)

There is a special offer.

T-shirts £5.80 each.
Buy 30 or more T-shirts.
Get 10% off the total cost.

(b) Work out the actual cost of buying 35 T-shirts using the special offer.

$$\begin{array}{r}
 5.80 \\
 \times 35 \\
 \hline
 29.00 \\
 174.00 \\
 \hline
 203.00
 \end{array}$$

Working out the cost of 35 t-shirts before the 10% discount

$203 \div 10 = 20.30$

Working out 10% of the total cost

$$\begin{array}{r}
 203.00 \\
 - 20.30 \\
 \hline
 182.70
 \end{array}$$

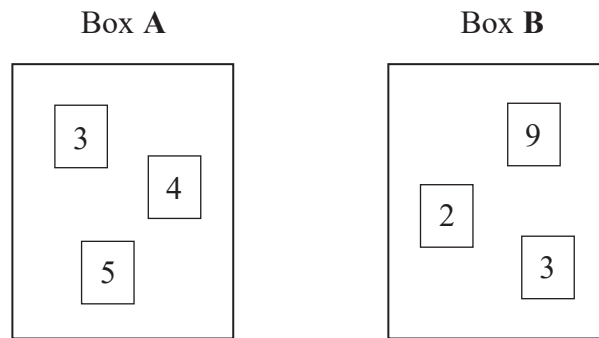
Subtracting the 10% to get the actual cost

£ 182.70

(4)

(Total for Question 16 is 5 marks)

- 17 There are 3 cards in Box A and 3 cards in Box B.
There is a number on each card.



Ryan takes at random a card from Box A and a card from Box B.
He adds together the numbers on the two cards to get a total score.

Work out the probability that the total score is an odd number.

$$3 + 9 = 12$$

$$3 + 2 = 5$$

$$3 + 3 = 6$$

$$4 + 9 = 13$$

$$4 + 2 = 6$$

$$4 + 3 = 7$$

$$5 + 9 = 14$$

$$5 + 2 = 7$$

$$5 + 3 = 8$$

4 out of the 9 possible
scores are odd

$$\frac{4}{9}$$

(Total for Question 17 is 2 marks)

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18 Harry, Regan and Kelan share £450 in the ratio 2 : 5 : 3

How much money does Kelan get?

$$10p = 450$$

There are 10 parts in total. These represent the total amount of money

$$p = 45$$

Dividing both sides by 10 works out that 1 part is £45

$$\begin{array}{r} 45 \\ \times 3 \\ \hline 135 \end{array}$$

3 parts represent Kelan so multiplying by 3 to work out how much these parts are worth

£..... 135

(Total for Question 18 is 2 marks)

DO NOT WRITE IN THIS AREA

19 Here is a list of ingredients for making 16 flapjacks.

Ingredients for 16 flapjacks

- 120 g butter
- 140 g brown sugar
- 250 g oats
- 2 tablespoons syrup

Jenny wants to make 24 flapjacks.

Work out how much of each of the ingredients she needs.

$$16x = 24$$

x is what 16 has been multiplied by to get 24

$$x = \frac{24}{16} = \frac{3}{2}$$

$$120 \times \frac{3}{2}$$

The number of flapjacks has been multiplied by 3/2 so all of the ingredients is multiplied by 3/2. Divide by 2 then multiply by 3 to multiply by 3/2

$$140 \times \frac{3}{2}$$

$$250 \times \frac{3}{2}$$

$$2 \times \frac{3}{2}$$

butter 180 g

brown sugar 210 g

oats 375 g

syrup 3 tablespoons

(Total for Question 19 is 3 marks)

DO NOT WRITE IN THIS AREA

20 Ami and Josh use a calculator to work out $\frac{595}{4.08^2 + 5.3}$

Ami's answer is 27.1115

Josh's answer is 271.115

One of these answers is correct.

Use approximations to find out which answer is correct.

$$\frac{600}{4^2 + 5} = \frac{600}{21} \approx \frac{600}{20} = \frac{60}{2} = 30$$

All numbers are rounded to 1 significant figure to begin with

Ami

27.1115 is closest to 30

(Total for Question 20 is 3 marks)

21 Work out $\frac{0.06 \times 0.0003}{0.01}$

Give your answer in standard form.

$$\frac{6 \times 10^{-2} \times 3 \times 10^{-4}}{1 \times 10^{-2}}$$

Converted all the numbers into standard form to make the calculation easier

$$\frac{18 \times 10^{-6}}{10^{-2}}$$

$6 \times 3 = 18$ and $10^{-2} \times 10^{-4} = 10^{-6}$
 $a^x \times a^y = a^{x+y}$. 1 multiplied by anything is itself

$$18 \times 10^{-4}$$

$10^{-6} \div 10^{-2} = 10^{-4}$
 $a^x \div a^y = a^{x-y}$

18 needs to be divided by 10 to get a number between 1 and 10. The power of 10 is increased by 1 to make up for this

$$1.8 \times 10^{-3}$$

(Total for Question 21 is 3 marks)

22 (a) Work out $\frac{2 \times 4}{5} + \frac{1 \times 5}{4 \times 5}$

$\frac{8}{20} + \frac{5}{20}$

Converted into equivalent fractions with the same denominators so they can be added

$\frac{13}{20}$
(2)

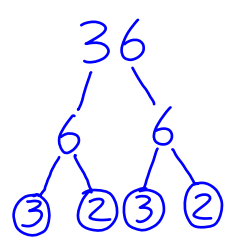
(b) Write down the value of 2^{-3}

The power of 3 means to cube. The negative power means it is the reciprocal

$\frac{1}{8}$
(1)

(Total for Question 22 is 3 marks)

23 Write 36 as a product of its prime factors.



$2^2 \times 3^2$

(Total for Question 23 is 2 marks)

- 24 Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.
The sum of their three ages is 77

Find the ratio of Jay's age to Kiaria's age to Martha's age.

$$J + J + 7 + 2(J + 7) = 77$$

Jay's age Kiaria is 7 years older than Jay Martha is twice as old as Kiaria The sum of their three ages is 77

$$4J + 21 = 77$$

Collected like terms and simplified

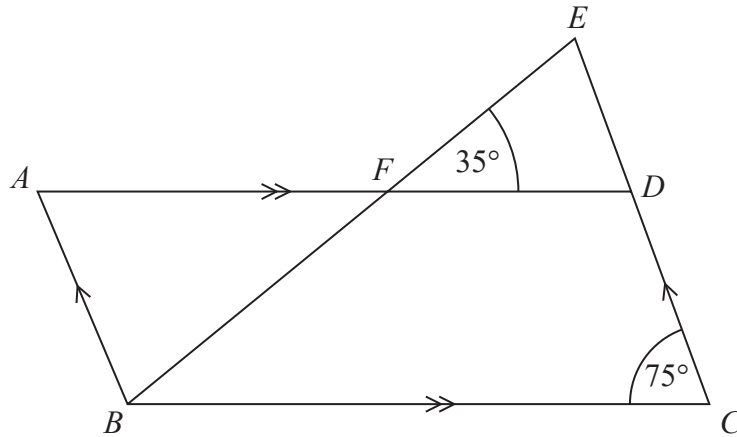
$$J = \frac{77 - 21}{4} = 14$$

Rearranged to make J the subject

Jay is 14 so Kiaria must be 21 and Martha must be 42

..... 14:21:42

(Total for Question 24 is 4 marks)



$ABCD$ is a parallelogram.

EDC is a straight line.

F is the point on AD so that BFE is a straight line.

Angle $EFD = 35^\circ$

Angle $DCB = 75^\circ$

Show that angle $ABF = 70^\circ$

Give a reason for each stage of your working.

Angle BAF is 75° as opposite angles in a parallelogram are equal.

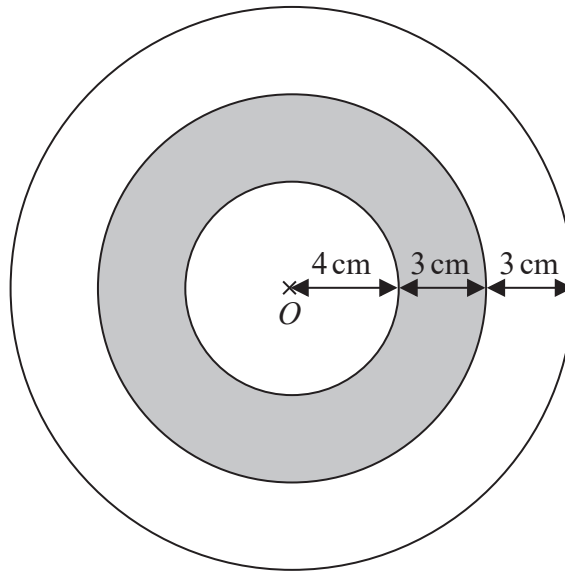
Angle BFA is 35° as vertically opposite angles are equal.

$$180 - 75 - 35 = 70$$

Angle ABF is 70° as there are 180° in a triangle.

(Total for Question 25 is 4 marks)

26 The diagram shows a logo made from three circles.



Each circle has centre O .

Daisy says that exactly $\frac{1}{3}$ of the logo is shaded.

Is Daisy correct?

You must show all your working.

$$\frac{\pi \times 7^2 - \pi \times 4^2}{\pi \times 10^2}$$

Expressing the shaded area as a fraction of the total area. Area of circle = $\pi \times \text{radius}^2$

$$\frac{49\pi - 16\pi}{100\pi}$$

$$\frac{33\pi}{100\pi} = \frac{33}{100}$$

No

$33/100$ is not equal to $1/3$

(Total for Question 26 is 4 marks)

27 The table shows information about the weekly earnings of 20 people who work in a shop.

Weekly earnings (£ x)	Frequency	Mid	fx
$150 < x \leq 250$	1	200	200
$250 < x \leq 350$	11	300	3300
$350 < x \leq 450$	5	400	2000
$450 < x \leq 550$	0	500	0
$550 < x \leq 650$	3	600	1800
			<u>7300</u>

(a) Work out an estimate for the mean of the weekly earnings.

$$20 \overline{) 7300} \begin{array}{r} 365 \\ \underline{600} \\ 1300 \\ \underline{1200} \\ 100 \end{array}$$

Mean = total/number

Working out the midpoint of each category then multiplying the midpoint by the frequency to get an estimated total for each category. Then adding up the totals to get an overall total

£ 365
(3)

Nadiya says,

“The mean may **not** be the best average to use to represent this information.”

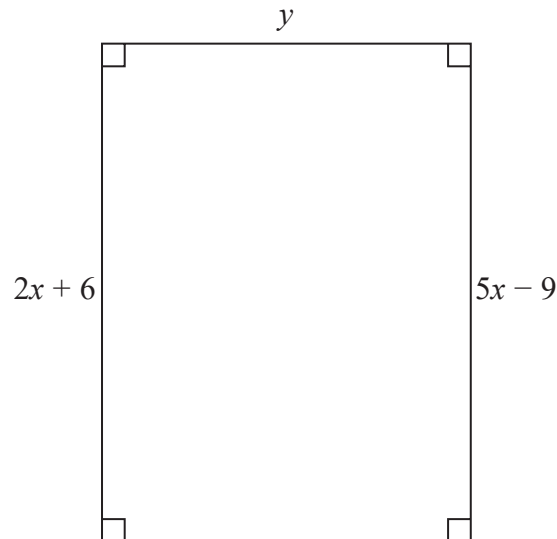
(b) Do you agree with Nadiya?
You must justify your answer.

Yes as the mean is effected by anomalies

(1)

(Total for Question 27 is 4 marks)

28 Here is a rectangle.



All measurements are in centimetres.

The area of the rectangle is 48 cm^2 .

Show that $y = 3$

$$2x + 6 = 5x - 9$$

← Opposite sides on a rectangle are equal

$$15 = 3x$$

← Subtract $2x$ from both sides to get all the x on one side then add 9 to both sides to get the x term on their own

$$5 = x$$

← Divide both sides by 3 to make x the subject

$$2(5) + 6 = 16$$

← Substituting x for 5 in an expression for the length of the rectangle to find the length

$$16y = 48$$

← Area of rectangle = length \times width
Length is 16cm and width is y

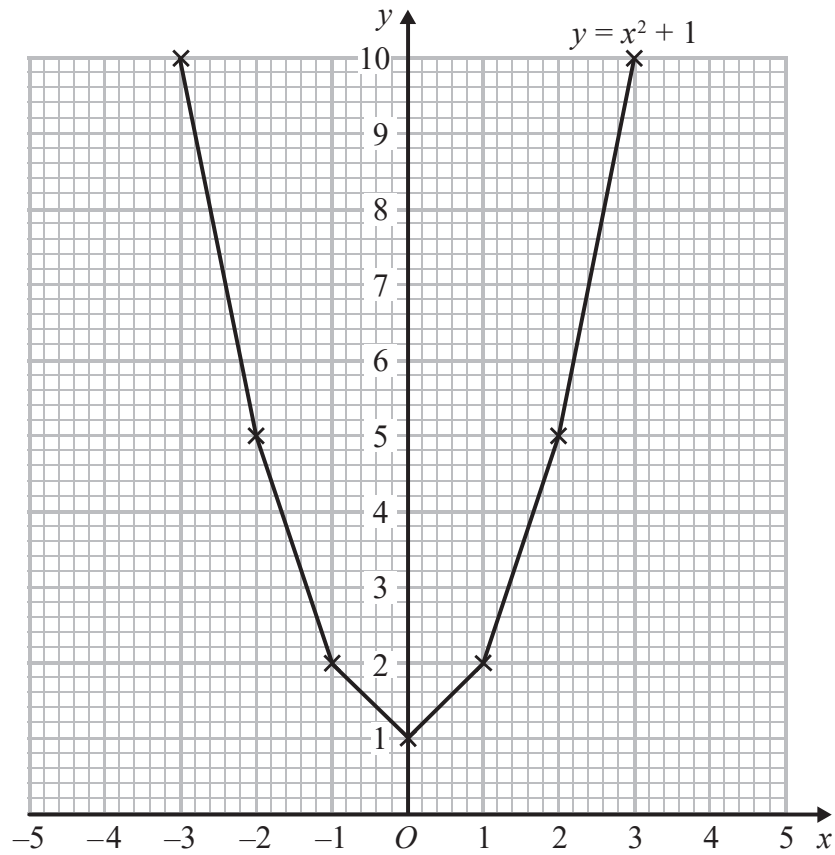
$$y = 3$$

← Dividing both sides by 16 to show that y is 3

(Total for Question 28 is 4 marks)

29 Brogan needs to draw the graph of $y = x^2 + 1$

Here is her graph.



Write down one thing that is wrong with Brogan's graph.

Should be a curve

(Total for Question 29 is 1 mark)

- 30 In a sale, the normal price of a book is reduced by 30%.
The sale price of the book is £2.80

Work out the normal price of the book.

$$x \times 0.7 = 2.80$$

x is the normal price. Multiplying by 0.7 reduces it by 30%

$$x = \frac{2.8}{0.7} = \frac{28}{7}$$

Rearranging to find x then simplifying the fraction by multiplying the numerator and denominator by 10

£.....4.....

(Total for Question 30 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS