Candidate surname

Other names

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

Centre Number

Candidate Number

Monday 11 November 2019

Afternoon (Time: 1 hour 30 minutes) | Paper Reference **1MA1/3F**

Mathematics

Paper 3 (Calculator)
Foundation Tier

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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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

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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write down two factors of 12

12 is divisible by both 1 and 12

........1........ , ...12........

(Total for Question 1 is 1 mark)

2 Find $\frac{1}{3}$ of 30

1/3 x 30 = 10 ← *'of' means to multiply*

........10........

(Total for Question 2 is 1 mark)

3 Write 0.7 as a fraction.

Type 0.7 into the calculator and it gives it as a fraction

........$\frac{7}{10}$........

(Total for Question 3 is 1 mark)

4 Here is a list of numbers.

$$7 \qquad 8 \qquad 15 \qquad 16 \qquad 18 \qquad 22$$

Write down the number from the list that is a multiple of 6

6 x 3 = 18 so 18 is a multiple of 6

........18........

(Total for Question 4 is 1 mark)

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5 Change 4 kilometres into metres.

4 x 1000 = 4000

There are 1000 metres in a kilometre so multiplying by 1000 converts it into metres

.... 4000 .... metres

(Total for Question 5 is 1 mark)

6 Here is a grid of squares.
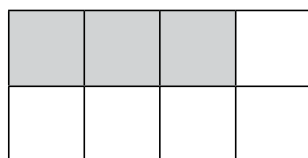
Write down the ratio of the number of shaded squares to the number of unshaded squares.

3 are shaded and 5 are unshaded

.... 3:5 ....

(Total for Question 6 is 1 mark)

7 $w = 4u + 3$

Find the value of w when $u = 8$

4×8+3

Substituting u for 8. 4u means 4 multiplied by u

.... 35 ....

(Total for Question 7 is 2 marks)

8 Here are the first five terms of a sequence.

1   +2   3   +3   6   +4   10   +5   15   +6   +7

Write down the next two terms of the sequence.

15 + 6 = 21
21 + 7 = 28

.... 21 .... , ... 28 ....

(Total for Question 8 is 2 marks)

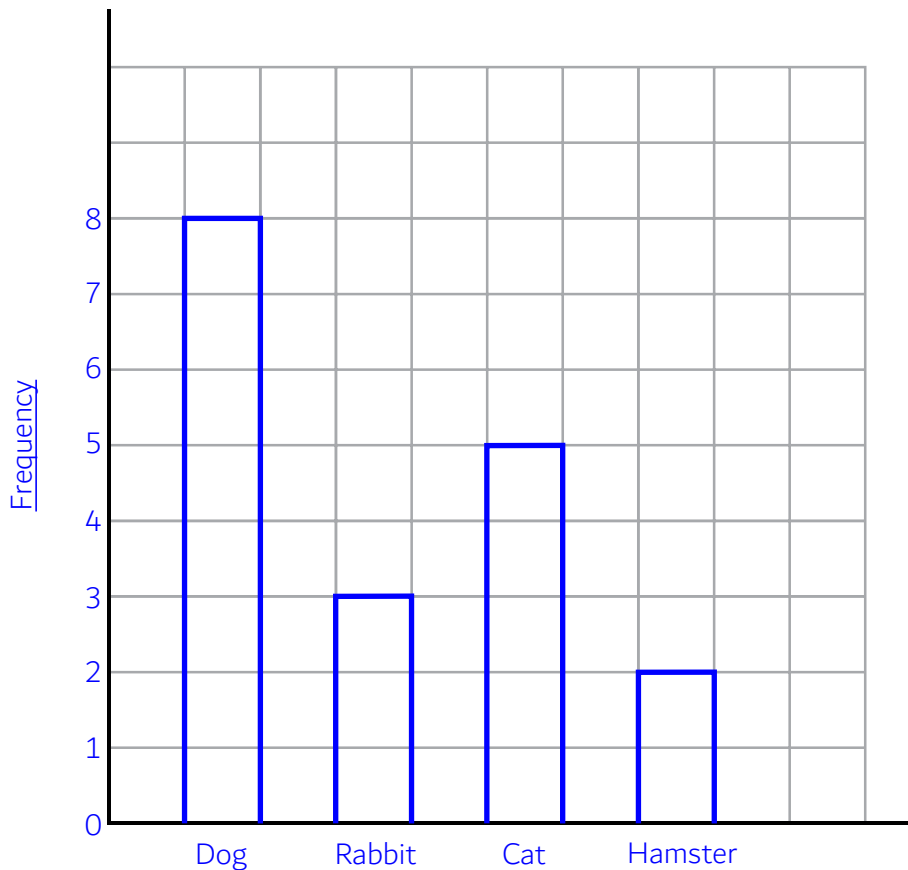**9** Mrs Brown asked each child in her class which pet they liked best.

Here are her results.

dog	rabbit	cat	dog	dog	hamster
cat	dog	rabbit	hamster	cat	cat
dog	dog	cat	dog	rabbit	dog

(a) Complete the frequency table for this information.

Pet	Tally	Frequency
dog	||||| |||	8
rabbit	|||	3
cat	|||||	5
hamster	||	2

(2)

(b) On the grid below, draw a bar chart for this information.

(3)

(c) Write down the most popular pet.

............................Dog............................

(1)

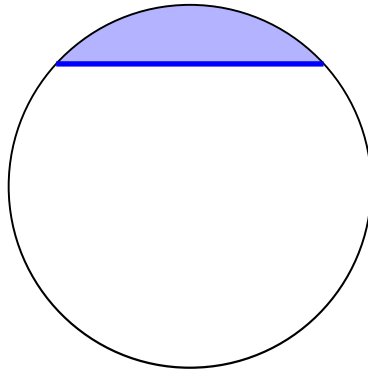**(Total for Question 9 is 6 marks)**

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10
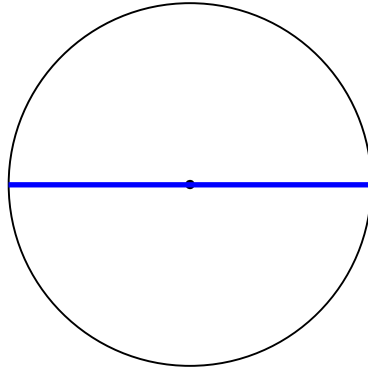
(a) On the diagram above, draw a diameter of the circle.

(1)

(b) On the diagram below, draw a segment of the circle.
Shade the segment.

(1)

(Total for Question 10 is 2 marks)

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11 Dylan buys 13 bicycle lights for £7.50 each.
He pays with five £20 notes.

(a) How much change should Dylan get?

$5 \times 20 - 13 \times 7.50$

5 x £20 works out how much he paid with. 13 x £7.50 works out how much the 13 bike lights cost in total. Subtracting this from the amount he paid leaves the change

£................2.50................

(3)

The normal price of a bicycle is £120

In a sale, there is $\frac{1}{5}$ off the normal price of the bicycle.

(b) Work out the price of the bicycle in the sale.

$\frac{4}{5} \times 120$

Reducing the price by 1/5 reduces it to 4/5. Working out 4/5 of the normal price

£................96................

(2)

(Total for Question 11 is 5 marks)

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12 Cornflakes are sold in two sizes of box.

Size of box	Weight of cornflakes
small	450 g
large	750 g

Rae buys 3 small boxes of cornflakes and some large boxes of cornflakes.
In total she buys 5850 g of cornflakes.

Work out the number of large boxes of cornflakes Rae buys.

$$\frac{5850 - 3 \times 450}{750}$$

3 x 450 works out the total mass of the 3 small boxes. Subtracting this from the 5850 leaves the mass of the large boxes. Dividing this by 750 works out how many lots of 750 it is and therefore how many large boxes there were

..................6..................

(Total for Question 12 is 3 marks)

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13 The stem and leaf diagram below gives information about the ages of people in a social club.

3	1	4	5		
4	0	2	2	5	6
5	0	1	7	7	8	9
6	3	4	5	9	
7	0	4			

Key: 4|2 represents 42 years

Find the range of these ages.

74 – 31 ← Range = largest - smallest. The largest age is 74 and the smallest age is 31

.... 43 .... years

(Total for Question 13 is 2 marks)

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14 Here is a rectangle.

3 cm

7 cm
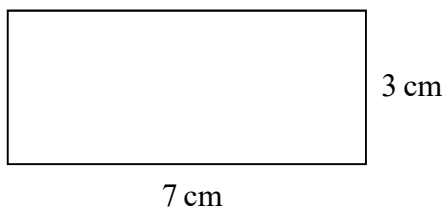
Coby has to find the perimeter of this rectangle.

He writes,

Perimeter = 7×3

(a) What mistake has Coby made?

This works out the area

(1)

Here is a triangle.

$(x + 8)$ cm $(x + 7)$ cm

x cm ◄ —— This length would be -2
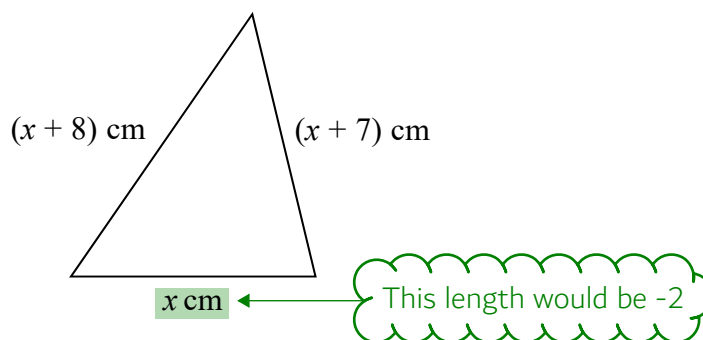
Iram solves a problem about this triangle to find the value of x.

Her answer is

$x = -2$

(b) Explain why Iram's answer must be wrong.

Length cannot be negative

(1)

(Total for Question 14 is 2 marks)

15 There are 800 students at a school.
Each student has either a school dinner or a packed lunch.

31% of the students have packed lunches.

55% of the students are boys.
60% of the boys have school dinners.

How many girls have packed lunches?
You must show all your working.

$\frac{31}{100} \times 800$ ← This works out that 31% of the students is 248 so this many have packed lunch

$\frac{55}{100} \times 800$ ← This works out that 55% of the students is 440 so this many are boys

$\frac{60}{100} \times 440$ ← This works out that 60% of the boys is 264 so this many boys have school dinners

	PL	SD	
B	176	264	440
G	72		
	248		800

Doing a two way table to organise the information. Filling in the information we have so far. 440 - 264 = 176 so this many boys have packed lunch. 248 - 176 = 72 so this many girls have packed lunches. There is no need to complete the whole table

.... 72 ....

(Total for Question 15 is 4 marks)

.CG Maths.

16 In a bag there are only red counters, blue counters, green counters and yellow counters.
A counter is taken at random from the bag.

The table shows the probabilities of getting a red counter or a yellow counter.

Colour	red	blue	green	yellow
Probability	0.4	0.15	0.2	0.25

the number of blue counters : the number of green counters = 3 : 4

Complete the table.

$\frac{1-0.4-0.25}{7}$

It is certain to get one of the four colours so their probabilities must add up to 1. So subtracting the probability of red and the probability of yellow from 1 leaves the probability of getting blue or green. Dividing this by 7, as there are 7 parts in total in the ratio which represent the total probability of blue or green, works out that 1 part of the ratio is worth 0.05

0.05×3 ← This works out that the value of the 3 parts representing blue is worth 0.15

0.05×4 ← This works out that the value of the 4 parts representing green is worth 0.2
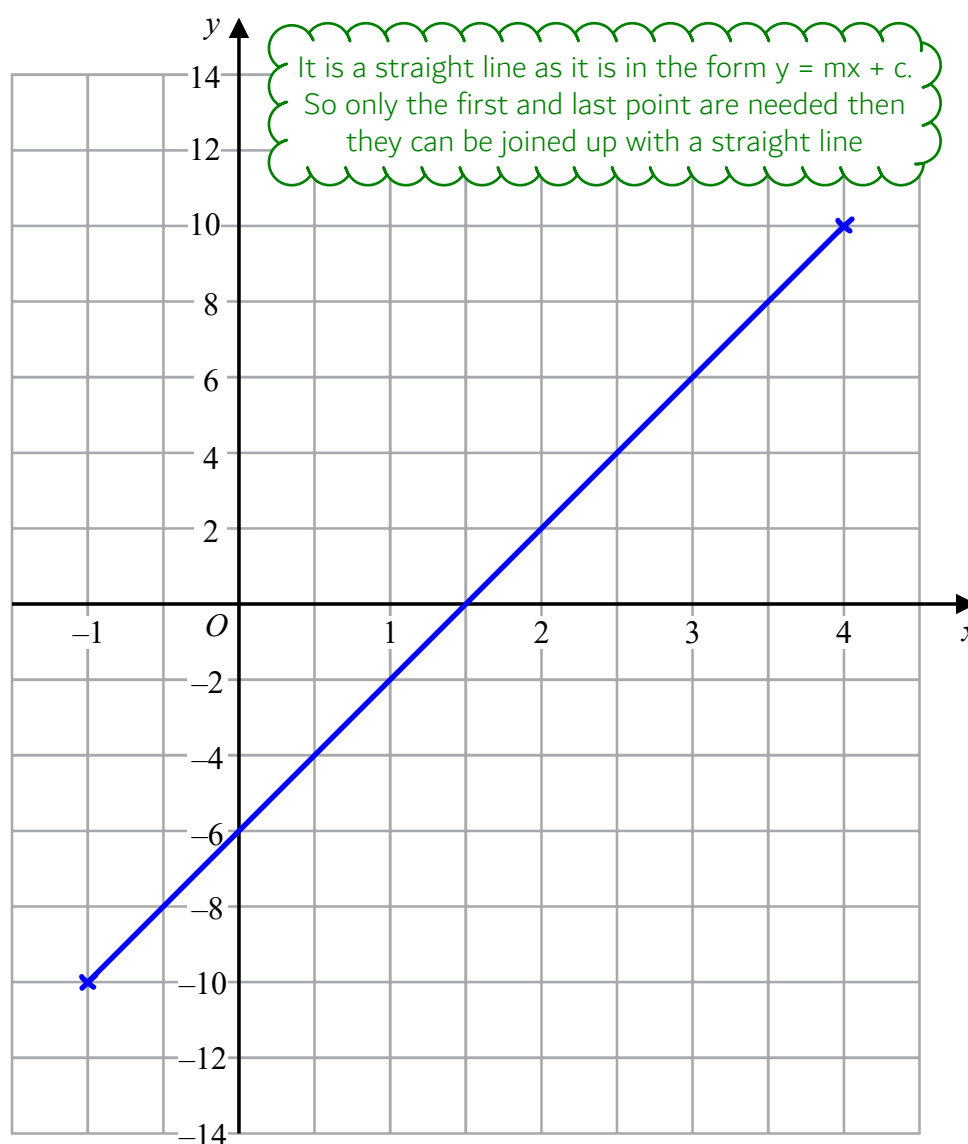
(Total for Question 16 is 4 marks)

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17 (a) Complete the table of values for $y = 4x - 6$

x	-1	0	1	2	3	4
y	-10	-6	-2	2	6	10

Use table mode. f(x) = 4x - 6. Start: -1. End: 4. Step: 1

(2)

(b) On the grid, draw the graph of $y = 4x - 6$ for values of x from -1 to 4

It is a straight line as it is in the form y = mx + c.
So only the first and last point are needed then
they can be joined up with a straight line

(2)

(Total for Question 17 is 4 marks)

.CG Maths.

18
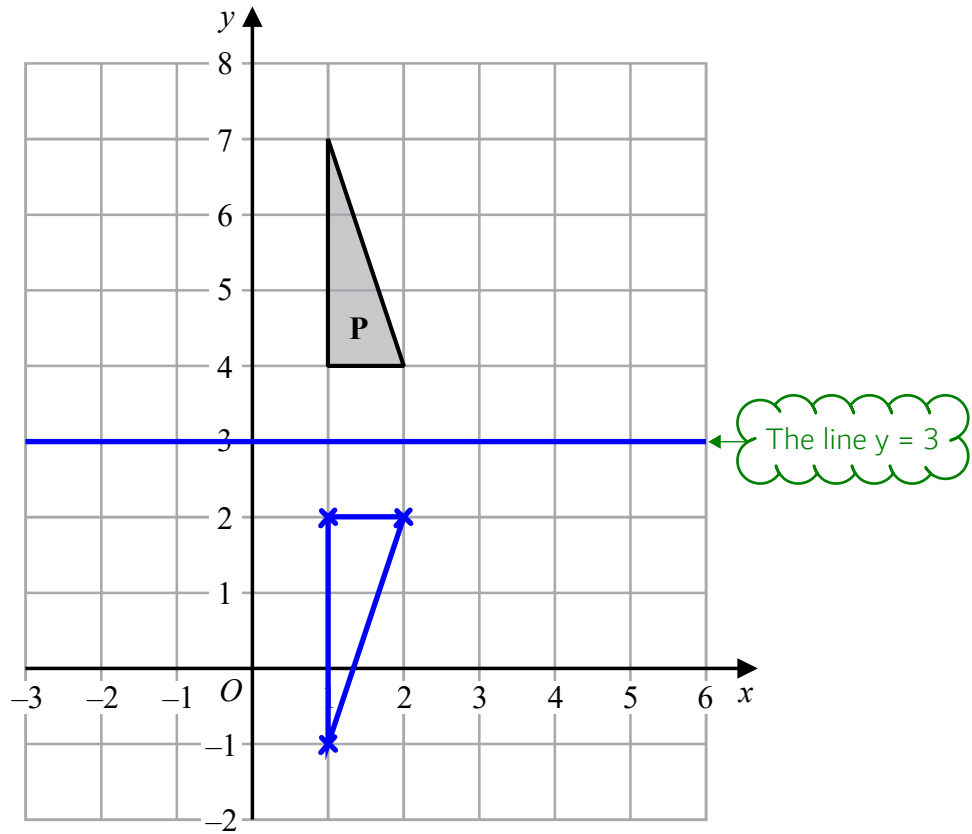
The line y = 3

Reflect shape **P** in the line $y = 3$

(Total for Question 18 is 2 marks)

Reflecting the corners first by counting the number of jumps to the line and doing the same number on the other side. Then joining up the corners with straight lines to form the reflected triangle

19 Solve $4(x - 6) = 44$

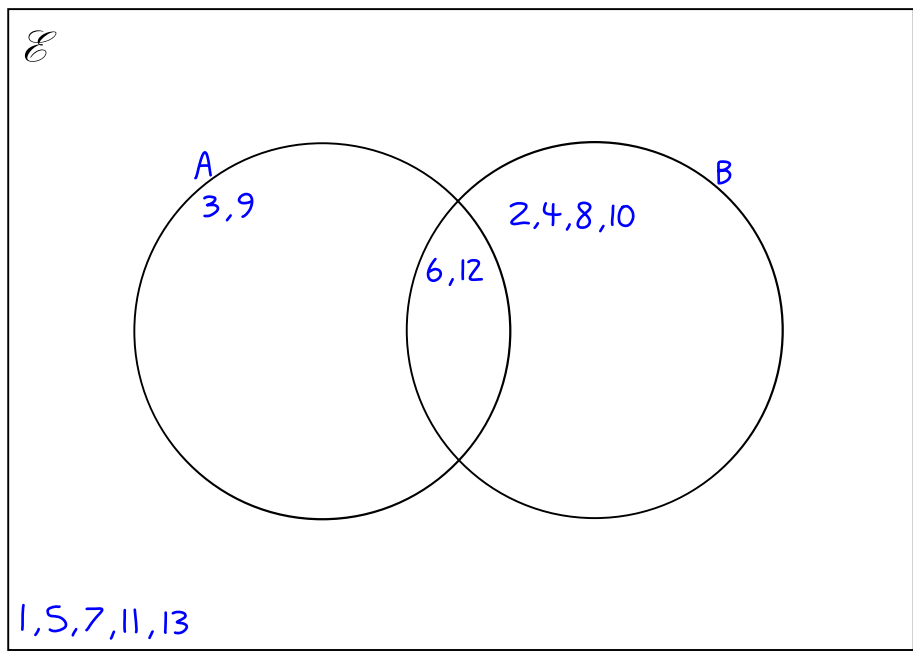$x - 6 = 11$ ← Dividing both sides by 4 to eliminate the 4 on the left

Adding 6 to both sides to eliminate the -6 on the left

$x =$ 17

(Total for Question 19 is 2 marks)

20 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$
$A = \{\text{multiples of 3}\}$
$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.

$\mathscr{E}$

A
3,9

B
2,4,8,10

6,12

1,5,7,11,13

(Total for Question 20 is 4 marks)

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21 Franco buys a house for £146 500

He sells the house for £158 220

Calculate the percentage profit Franco makes.

$$\frac{158220 - 146500}{146500} \times 100$$

Subtracting the original price from the new price works out the change. Putting this over the original works out the fraction change. Multiplying this by 100 works out the percentage change, which is the percentage profit

......................8...................... %

(Total for Question 21 is 3 marks)

22 (a) Expand and simplify $(x + 5)(x - 9)$

$x^2 - 9x + 5x - 45$

.... $x^2 - 4x - 45$ ....

(2)

(b) Factorise fully $9x^2 + 6x$

> 3 is the highest common factor of 9 and 6. x is the highest common factor of x^2 and x. Bringing both of these out as factors and leaving the remainder in a bracket

.... $3x(3x+2)$ ....

(2)

(Total for Question 22 is 4 marks)

23 (a) Use your calculator to work out $\dfrac{29^2 - 4.6}{\sqrt{35 - 1.9^3}}$
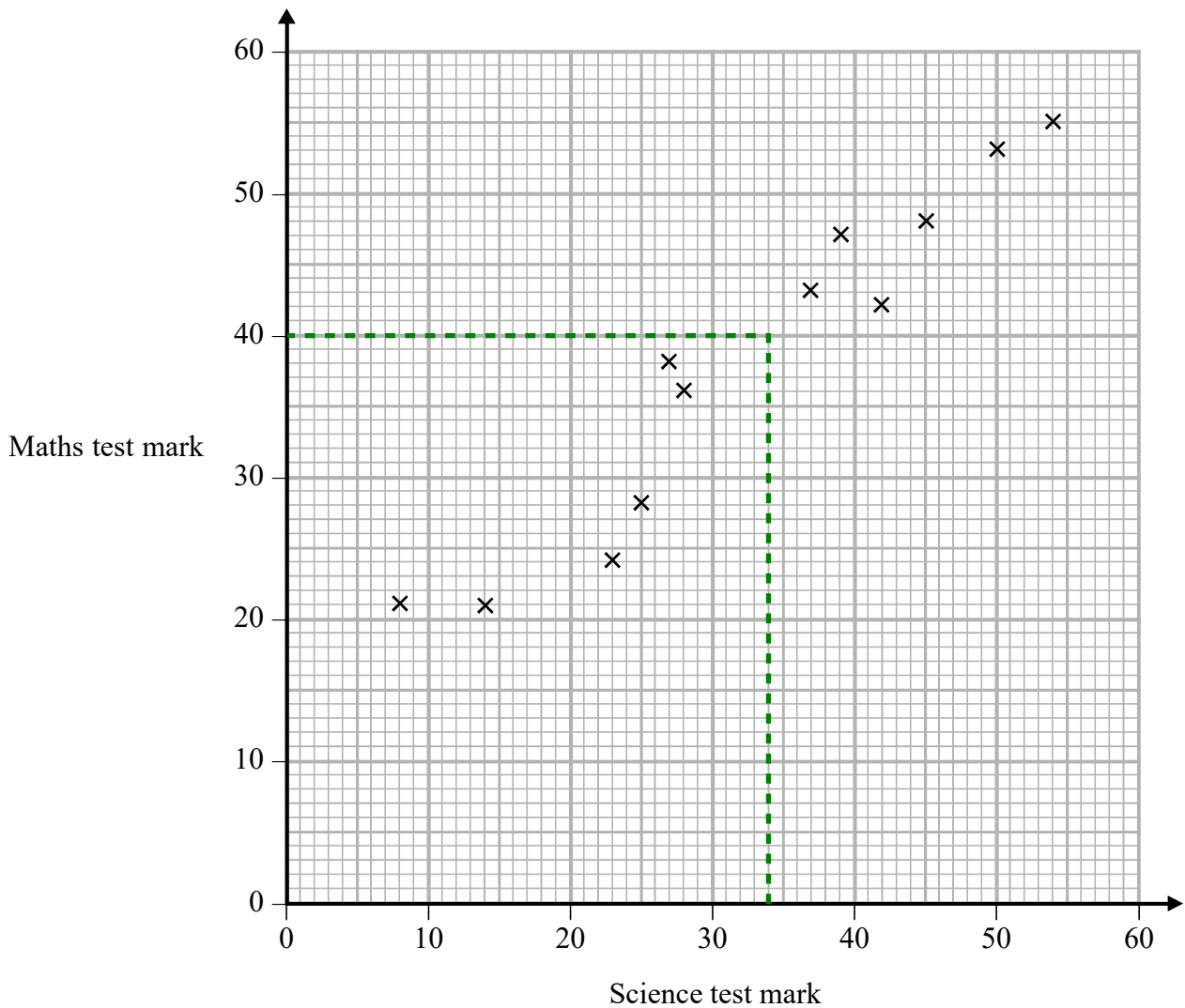
Write down all the figures on your calculator display.

.... 157.668255 ....

(2)

(b) Write your answer to part (a) correct to 4 significant figures.

.... 157.7 ....

(1)

(Total for Question 23 is 3 marks)

.CG Maths.

24 The scatter graph shows information about the marks a group of students got in a Science test and in a Maths test.

Maths test mark

Science test mark

Jamie got a mark of 34 in the Science test.

Using the scatter graph, find an estimate for Jamie's mark in the Maths test.

Reading up from 34 to somewhere in the middle of the data points close by then reading across works out the estimate. There is no need to draw a line of best fit as this may make it harder to get an easy value to read

....40...

(Total for Question 24 is 2 marks)

.CG Maths.

25 The table gives information about the times taken, in seconds, by 18 students to run a race.

Time (t seconds)	Frequency
$5 < t \leqslant 10$	1
$10 < t \leqslant 15$	2
$15 < t \leqslant 20$	7
$20 < t \leqslant 25$	8

Work out an estimate for the mean time.
Give your answer correct to 3 significant figures.

$$\frac{\frac{5+10}{2} \times 1 + \frac{10+15}{2} \times 2 + \frac{15+20}{2} \times 7 + \frac{20+25}{2} \times 8}{18}$$

Working out the mean of the upper and lower bound of each interval works out the midpoints. To do this, the upper and lower bound are added for each interval then divided by 2 as there are 2 numbers. The midpoint is the best estimate for the values of each of the times. Multiplying the midpoints by the frequencies works out an estimate for the total time of each interval. Adding all of these together works out an overall estimated total time for all 18 students. Mean = total/number, so the estimated total time is divided by the 18 students

The value of $18.6\dot{1}$ is rounded to 3 significant figures

.................18.6................. seconds

(Total for Question 25 is 3 marks)

.CG Maths.

26 Write $37 \, cm^3$ in mm^3

37×10^3 ← There are 10mm in 1cm so multiplying by 10 converts centimetres into millimetres. However the unit is cubed so the 37 needs to be multiplied by 10^3

.... 37000 .... mm^3

(Total for Question 26 is 1 mark)

27 Nimer was driving to a hotel.
He looked at his Sat Nav at 13 30

Time	13 30
Distance to destination	65 miles

Nimer arrived at the hotel at 14 48

Work out the average speed of the car from 13 30 to 14 48
You must show all your working.

$\dfrac{65}{14°48' - 13°30'}$ ← From the unit of mph, the number of miles needs to be divided by the time in hours. Subtracting the 13 30 from 14 48 works out how much time the journey took

Time can be put into the calculator by using the time button

.... 50 .... mph

(Total for Question 27 is 4 marks)

.CG Maths.

28 (a) Write $32\,460\,000$ in standard form.

> The number needs to be divided by 10 7 times to make it between 1 and 10. So it needs to be multiplied by 10^7 to keep it equal

.... 3.246×10^7 ....
(1)

(b) Write 4.96×10^{-3} as an ordinary number.

> $\times 10^{-3}$ means to divide by 10 3 times. This moves the decimal point 3 times to the left

.... 0.00496 ....
(1)

Asma was asked to compare the following two numbers.

$$A = 6.212 \times 10^8 \quad \text{and} \quad B = 4.73 \times 10^9$$

She says,

"6.212 is bigger than 4.73 so A is bigger than B."

(c) Is Asma correct?
You must give a reason for your answer.

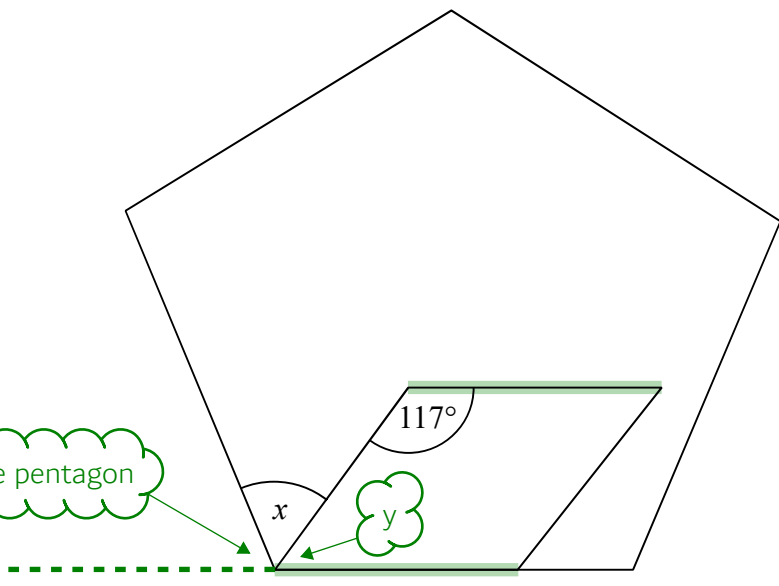No as $6.212 \times 10^8 - 4.73 \times 10^9$ is negative

(1)

(Total for Question 28 is 3 marks)

.CG Maths.

29 The diagram shows a regular pentagon and a parallelogram.

117°

x y

Exterior angle of the pentagon

Work out the size of the angle marked *x*.
You must show all your working.

$\left(180 - \frac{360}{5}\right) - (180 - 117)$

The exterior angles of any polygon add up to 360°. So 360/5 works out the exterior angle of the regular pentagon as it has 5 exterior angles and they are all equal. There are 180° around a point on a straight line and the exterior angle and interior angle lie on a straight line so subtracting the exterior angle from 180 leaves the interior angle (x and y combined). 180 - 117 works out the angle y as the lines highlighted in green are parallel and co-interior angles add up to 180°. Subtracting angle y from the interior angle leaves angle x

............45............ °

(Total for Question 29 is 4 marks)

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30 **A** is in the shape of a quarter circle of radius 15 cm.
B is in the shape of a circle.

A

15 cm

B
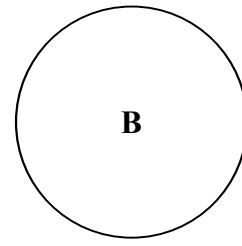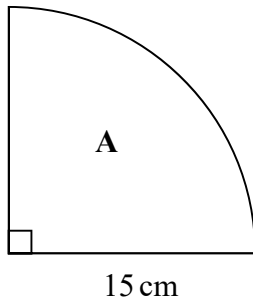
The area of **A** is 9 times the area of **B**.

Show that the radius of **B** is 2.5 cm.

$\frac{\pi \times 15^2}{4} = 9\pi r^2$

Area of a circle = π x radius². The area of A is expressed by using the formula for the area of a circle by substituting in 15 as the radius then dividing by 4 as it is a quarter of a full circle. Multiplying the area of B by 9 makes it equal to the area of A. Leaving r as the radius

$\sqrt{\frac{\pi \times 15^2}{4 \times 9\pi}} = r = 2.5$

Rearranged to make r the subject by dividing both sides by 9π then square rooting both sides. This gives 2.5

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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