

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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

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**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  $\pi$  button, take the value of  $\pi$  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 should be written in the exam.

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

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

'of' means to multiply.  $\frac{1}{3} \times 30 = 10$

..... 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      8      15      16      18      22

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

$6 \times 3 = 18$  so 18 is a multiple of 6

..... 18 .....

(Total for Question 4 is 1 mark)

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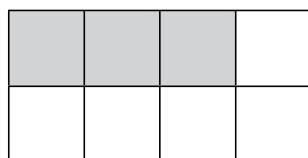
5 Change 4 kilometres into metres.

There are 1000 metres in a kilometre so multiplying by 1000 converts it into metres.  $4 \times 1000 = 4000$

.....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  $u = 8$

$4 \times 8 + 3$  ← Substituting  $u$  for 8 in the right side.  $4u$  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.

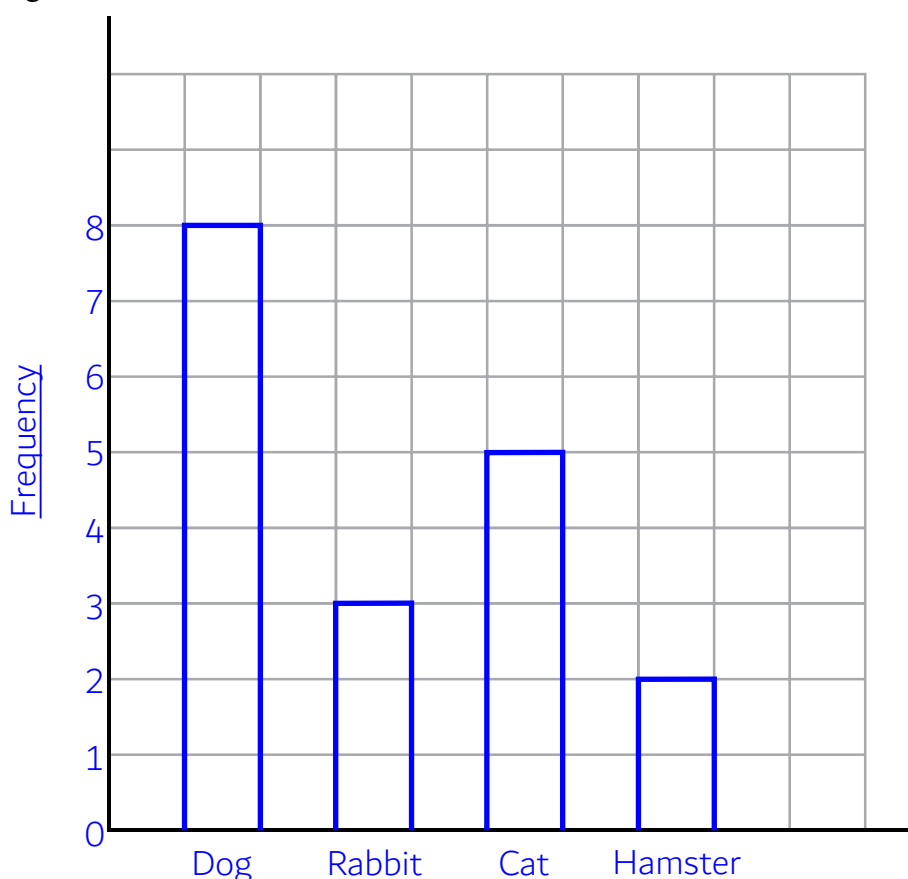
dog            rabbit            cat            dog            dog            hamster  
 cat            dog            rabbit            hamster            cat            cat  
 dog            dog            cat            dog            rabbit            dog

(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)

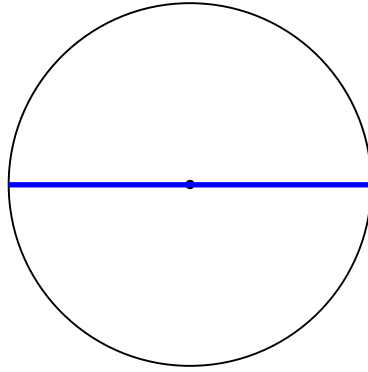
(c) Write down the most popular pet.

Dog

(1)

(Total for Question 9 is 6 marks)

10

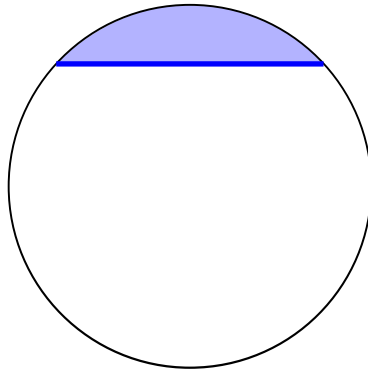


(a) On the diagram above, draw a diameter of the circle.

A straight line going from one side of the circle to the other which goes through the centre

(1)

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



(1)

(Total for Question 10 is 2 marks)

The area between a chord and the circumference. The circumference is the outside of the circle. A chord is a straight line connecting two points on the circumference

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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?

$$7.50 \times 13 = 97.50$$

Multiplying the £7.50 cost of each light by the 13 lights works out that the total cost is £97.50

$$20 \times 5 = 100$$

Multiplying £20 by 5 works out that £100 is paid

$$100 - 97.50$$

Subtracting the £97.50 cost from the £100 paid works out that £2.50 is the change as £2.50 too much is paid

£ ..... 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.

$$\frac{1}{5} \times 120$$

This works out that  $\frac{1}{5}$  of the £120 normal price is £24

$$120 - 24$$

Reducing the £120 normal price by the £24 (which is  $\frac{1}{5}$  of the £120) works out that the sale price is £96

£ ..... 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.

$450 \times 3$  ← Multiplying the 450 g of each small box by the 3 small boxes works out that the total weight of the 3 small boxes is 1350 g

$5850 - 1350$  ← Subtracting the 1350 g total weight of the 3 small boxes from the total 5850 g works out that the large boxes weigh 4500 g

$4500 \div 750$  ← Dividing the 4500 g weight of the large boxes by the 750 g weight of each large box works out that there are 6 large boxes

.....6

(Total for Question 12 is 3 marks)

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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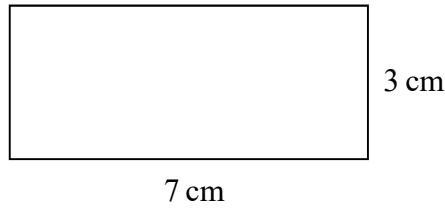
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14 Here is a rectangle.



Coby has to find the perimeter of this rectangle.

He writes,

$$\text{Perimeter} = 7 \times 3$$

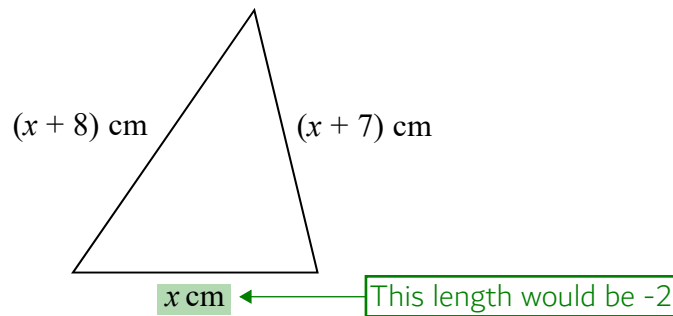
(a) What mistake has Coby made?

This works out the area

Perimeter is the total of the outside sides

(1)

Here is a triangle.



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.

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

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

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

	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)

- 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

$$0.05 \times 3$$

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

$$0.05 \times 4$$

This works out that the value of the 4 parts representing green is worth 0.2

(Total for Question 16 is 4 marks)

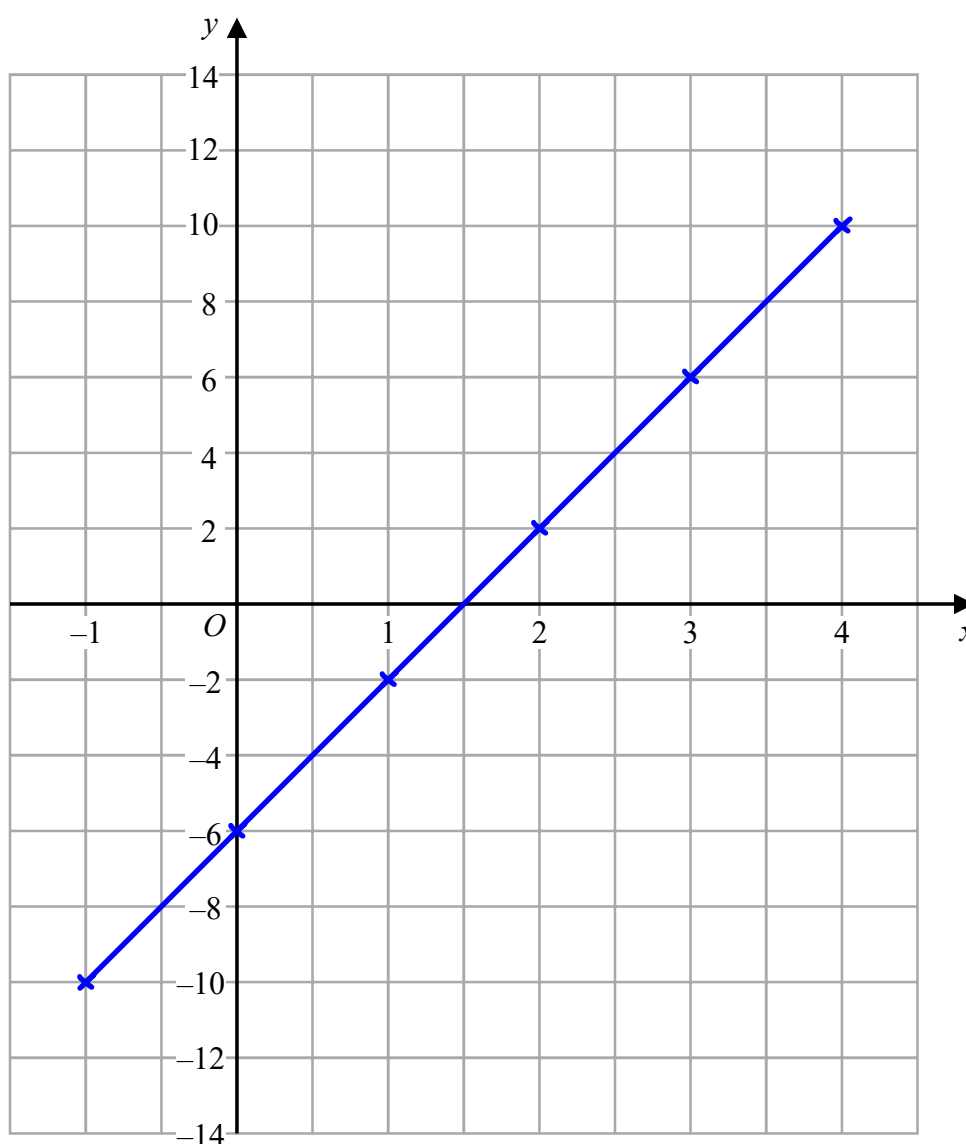
17 (a) Complete the table of values for  $y = 4x - 6$

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

Use table mode on the calculator. Define  $f(x) = 4x - 6$ . Start: -1. End: 4. Step: 1

(2)

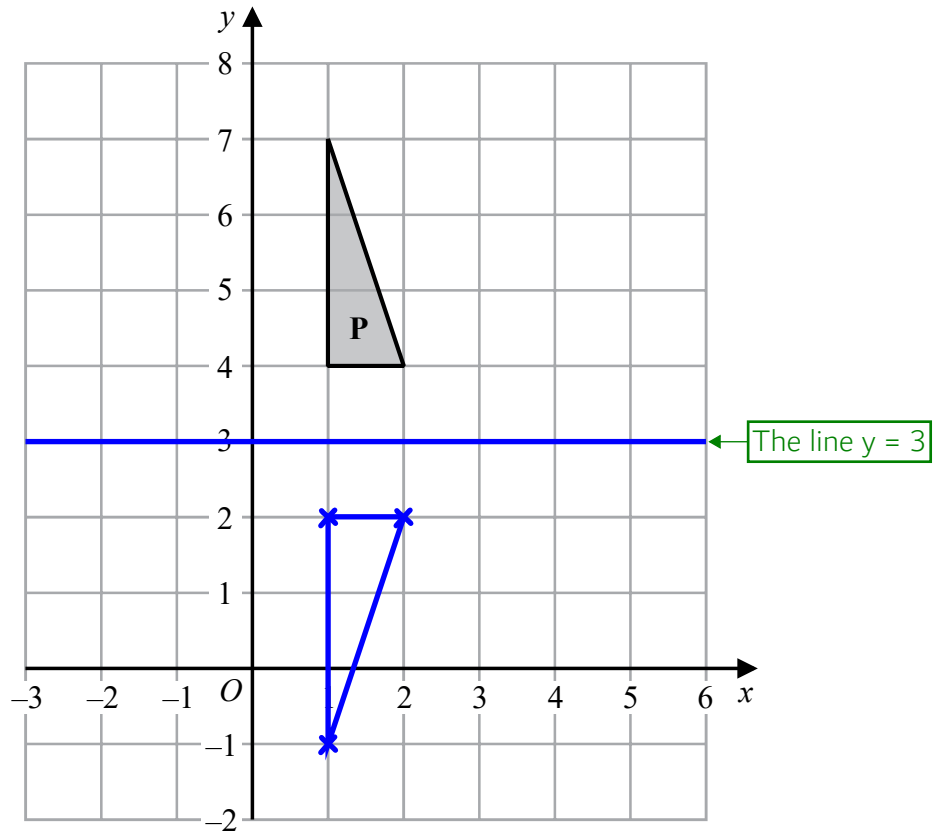
(b) On the grid, draw the graph of  $y = 4x - 6$  for values of  $x$  from -1 to 4



Plotting the points then joining them up with a straight line

(2)

(Total for Question 17 is 4 marks)



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

$x = \dots\dots\dots 17$

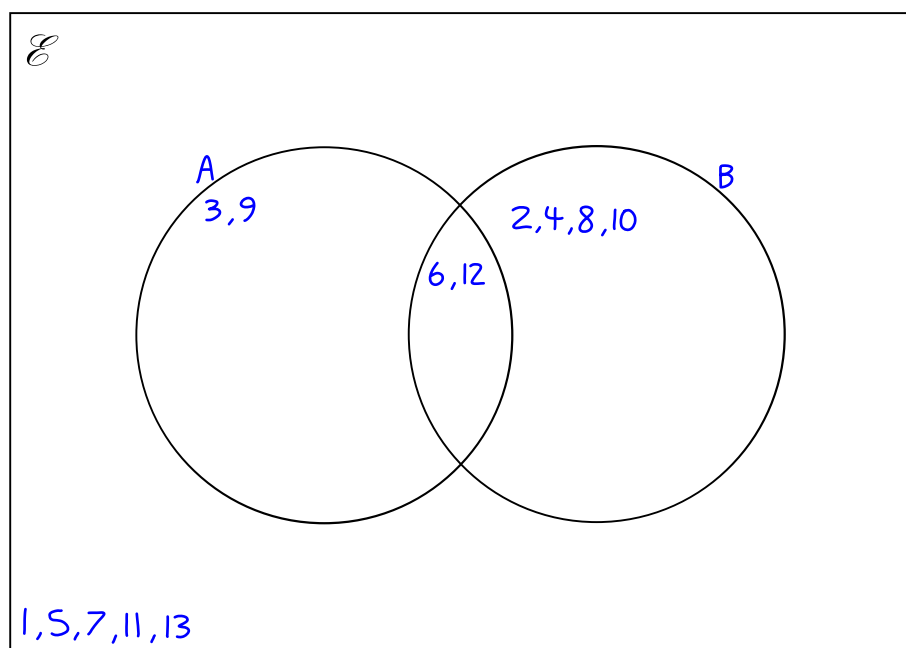
(Total for Question 19 is 2 marks)

20  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$

$A = \{\text{multiples of 3}\}$

$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.



(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  $(x + 5)(x - 9)$

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

$x \times x = x^2$ $x \times -9 = -9x$ $5 \times x = 5x$ $5 \times -9 = -45$
---

Collecting like terms

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

(2)

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

3x is the highest common factor of both terms. Bringing this out as a factor, dividing both terms by 3x and leaving the result in a bracket

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

(2)

(Total for Question 22 is 4 marks)

23 (a) Use your calculator to work out  $\frac{29^2 - 4.6}{\sqrt{35 - 1.9^3}}$

Write down all the figures on your calculator display.

Type into the calculator

This is the 4th significant figure

$$157.668255$$

(2)

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

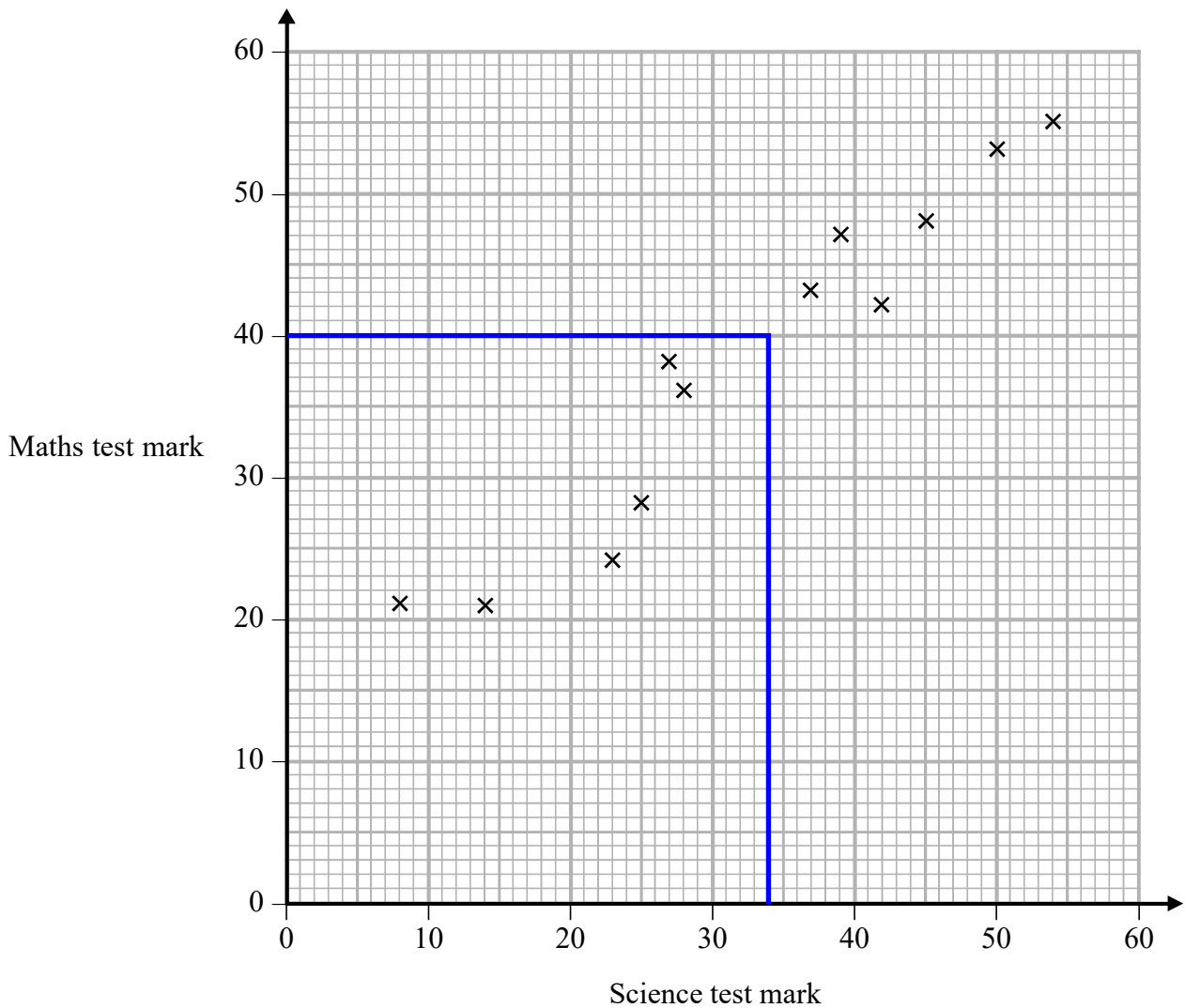
The 4th significant figure rounds to 7 as there is a 6 after it. Everything after the 4th significant figure is then set to 0 and ignored

$$157.7$$

(1)

(Total for Question 23 is 3 marks)

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



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 an estimate

40

(Total for Question 24 is 2 marks)

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

Time ( $t$ seconds)	Frequency
$5 < t \leq 10$ 7.5	$\times$ 1 = 7.5
$10 < t \leq 15$ 12.5	$\times$ 2 = 25
$15 < t \leq 20$ 17.5	$\times$ 7 = 122.5
$20 < t \leq 25$ 22.5	$\times$ 8 = 180

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

$$335 \div 18$$

A: writing the midpoints of each interval. Each interval has a difference of 5 between the least and greatest values.  $5 \div 2 = 2.5$ . So adding 2.5 to the least value of each interval works out the midpoints.

B: multiplying the midpoints by the frequencies works out an estimated total time for each interval.

C: adding all these totals gives an overall estimated total.

D: dividing this overall estimated total by the 18 students estimates the mean

18.61... is rounded to 3 significant figures

18.6

seconds

(Total for Question 25 is 3 marks)

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26 Write  $37\text{ cm}^3$  in  $\text{mm}^3$

$37 \times 10^3$

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

..... 37000 .....  $\text{mm}^3$

(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.

$14^{\circ}48^{\circ} - 13^{\circ}30^{\circ}$

Subtracting 13 30 from 14 48 works out how much time it takes. Entering the times as sexagesimals in the calculator. The answer of  $1^{\circ}18'0''$  can be read as 1 hour 18 minutes. Formatting this as a decimal gives 1.3 hours

$65 \div 1.3$

Miles per hour means to divide the distance in miles by the time in hours

..... 50 ..... mph

(Total for Question 27 is 4 marks)

28 (a) Write 32460000 in standard form.

The number needs to be divided by  $10^7$  times to make it 3.246, which is at least 1 and less than 10. So it needs to be multiplied by  $10^7$  to keep it equal

$$3.246 \times 10^7$$

(1)

(b) Write  $4.96 \times 10^{-3}$  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

So B must be bigger than A

(1)

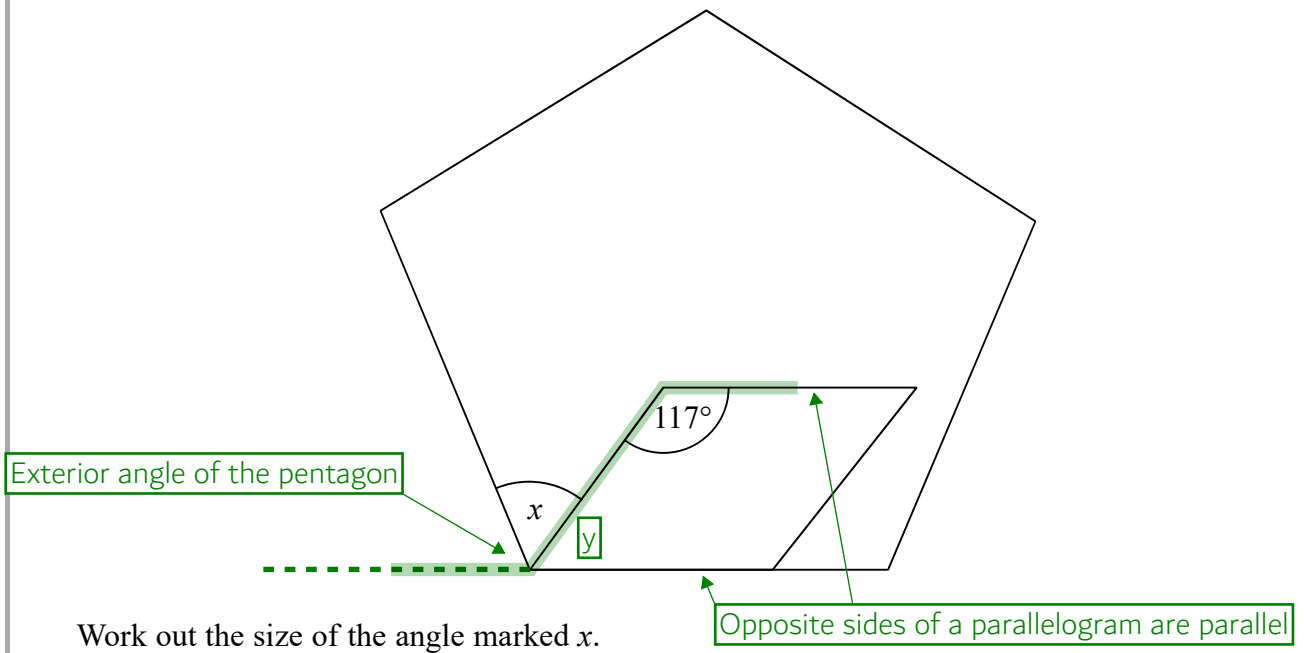
(Total for Question 28 is 3 marks)

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29 The diagram shows a regular pentagon and a parallelogram.



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

$360 \div 5$

Exterior angles of any polygon add up to  $360^\circ$ . So dividing  $360^\circ$  by the 5 equal exterior angles works out that each one is  $72^\circ$

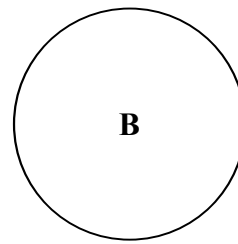
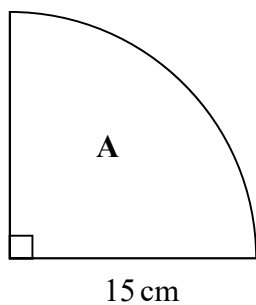
$117 - 72$

The total of  $x$  and the exterior angle is  $117^\circ$  as alternate angles (the inside of the z-shape) are equal. Subtracting the exterior angle from  $117^\circ$  works out that  $x$  is  $45^\circ$

..... 45 °

(Total for Question 29 is 4 marks)

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



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

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

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

Expressing the area of A and setting this equal to 9 times the area of B. Area of circle =  $\pi \times \text{radius}^2$ . Let r by the radius of B. Dividing the area of circle A by 4 as it is a quarter circle

$$r^2 = 6.25$$

Dividing both sides by  $9\pi$  gets  $r^2$  on its own

$$r = 2.5$$

Square rooting both sides shows that the radius of B is 2.5 cm

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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