

Write your name here

Surname

Other names

Centre Number

Candidate Number

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

# Mathematics

## Paper 3 (Calculator)

**Foundation Tier**

Wednesday 8 November 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  $\pi$  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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6/6/7/7/2/

# .CG Maths.

Hints



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](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 3758 correct to the nearest 1000

The 7 after the 3 in the thousands place causes it to round...  
All digits after the thousands are ignored and are set to 0

(Total for Question 1 is 1 mark)

- 2 Simplify  $y + 3y - 2y$

$$\begin{aligned} y + 3y &= 4y \\ 4y - 2y &= \dots \end{aligned}$$

(Total for Question 2 is 1 mark)

- 3 Write down all the factors of 18

Listing them in pairs starting with the smallest and largest.  $1 \times 18 = 18$  so both 1 and 18 are factors

1, 18

(Total for Question 3 is 2 marks)

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4 The table gives information about the prices of cinema tickets.

Cinema ticket	Price
adult ticket	£7.80
child ticket	£5.80
family ticket (for 4 people)	£24.30

Mr Edwards and his 3 children go to the cinema.

It is cheaper for Mr Edwards to buy 1 family ticket rather than 4 separate tickets.

(a) How much cheaper?

Work out the total cost of 1 adult and 3 children then subtract the cost of a family ticket to work out the difference in price

.....  
(3)

The film starts at 6.45 pm.  
The film lasts 102 minutes.

(b) What time does the film finish?

**FACT B** On the calculator, type  $6^{\circ}45' + 0^{\circ}102'$ .  
 Press the button on the left to get the  $^{\circ}$

.....  
(2)

**(Total for Question 4 is 5 marks)**

- 5 Thais has a large bottle of shampoo.  
There are 2 litres of shampoo in the large bottle.




Thais also has some empty small bottles.  
Each small bottle can be completely filled with 150 ml of shampoo.

How many small bottles can be completely filled with shampoo from the large bottle?

Convert the 2 litres into millilitres so the units are the same. There are 1000ml in 1L. Then work out how many lots of 150ml go into this. The answer will have to be rounded to a whole number; remember that the bottles need to be completely filled when rounding

(Total for Question 5 is 3 marks)

- 6 The incomplete pictogram shows information about the number of cycles sold in a shop on Tuesday, on Wednesday and on Thursday.

Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	

Key:

A total of 20 cycles were sold on Tuesday, Wednesday and Thursday.

8 cycles were sold on Friday.

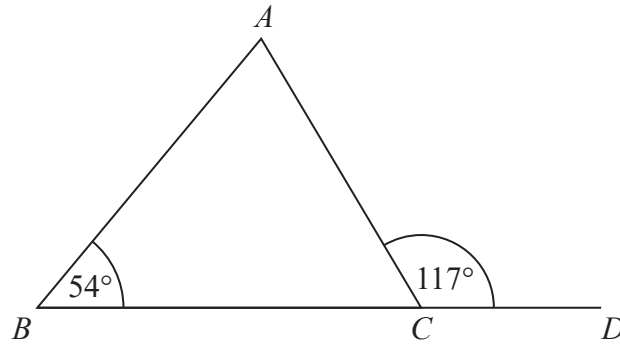
15 cycles were sold on Saturday.

Use this information to complete the pictogram.

First fill in the key and work out how much 1 circle is worth by dividing the total of 20 cycles by the total number of circles for Tuesday, Wednesday and Thursday. Divide 8 and 15 by the worth of 1 circle to work out how many circles are needed for Friday and Saturday

(Total for Question 6 is 3 marks)

7



$BCD$  is a straight line.

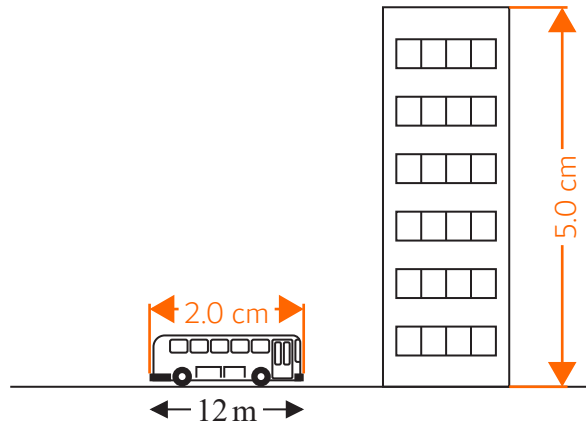
$ABC$  is a triangle.

Show that triangle  $ABC$  is an isosceles triangle.

Give a reason for each stage of your working.

The problem can be solved using the following facts: angles around a point on a straight line add up to 180 degrees, angles in a triangle add up to 180 degrees and isosceles triangles have 2 equal angles

(Total for Question 7 is 4 marks)



The picture shows a bus next to a building.  
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

Work out an estimate for the height, in metres, of the building.

First work out the worth of 1cm on the diagram  
then multiply this by 5 to find the worth of 5cm

..... m

(Total for Question 8 is 2 marks)

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9 Nidah writes down two different prime numbers.

She adds together her two numbers.  
Her answer is a square number less than 30

Find two prime numbers that Nidah could have written down.

2 is the smallest prime number. Trying adding different prime numbers to it (starting with the smallest) until we get a square number. Prime numbers are only divisible by themselves and 1. Square numbers are the result of multiplying a whole number by itself

..... , .....

(Total for Question 9 is 2 marks)

10 Jim thinks of a number.

$\frac{2}{3}$  of Jim's number is 48

Work out  $\frac{5}{6}$  of Jim's number.

$$\frac{2}{3}x = 48$$

Let x be Jim's number. 'Of' means to multiply

Rearrange to find x to work out Jim's number. Then find 5/6 of the number

.....

(Total for Question 10 is 2 marks)



11 Jack's driving school has two offers.

**Offer 1**

First driving lesson free  
All other driving lessons normal price

**Offer 2**

All driving lessons  
5% off the normal price

The normal price of a driving lesson is £24

Douglas is going to have 12 driving lessons.

Which is the cheaper offer for 12 driving lessons, Offer 1 or Offer 2?

You must show how you get your answer.

For Offer 1, the first lesson is free so he only pays for 11 lessons. For Offer 2, the £24 needs to be reduced by 5% then multiplied by 12. The lowest cost is the cheapest option

(Total for Question 11 is 3 marks)

12 2.5 kg of apples cost £3.60

Work out the cost of 3.5 kg of apples.

First work out the cost of 1kg then multiply this by 3.5

£.....

(Total for Question 12 is 2 marks)

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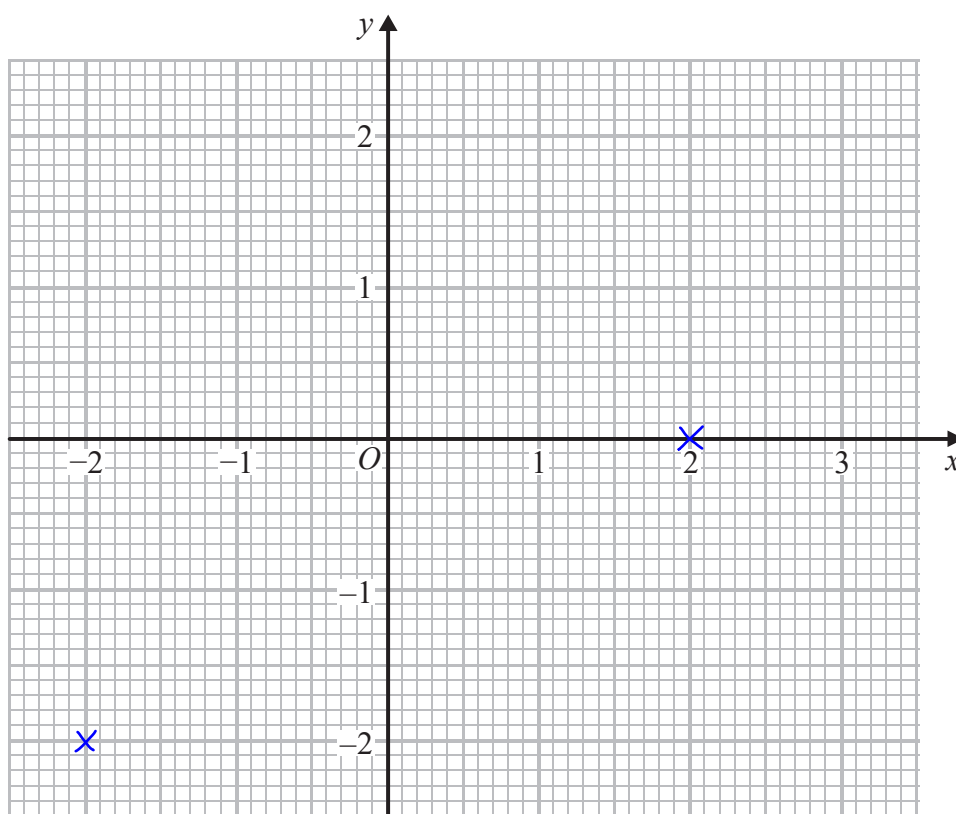
13 (a) Complete the table of values for  $y = \frac{1}{2}x - 1$

Using table mode (press Menu then 3), type  $f(x) = 1/2 x - 1$ . Ignore  $g(x)$  then set Start to -2, End to 3 and Step to 1. We then get a completed table

x	-2	-1	0	1	2	3
y	-2				0	

(2)

(b) On the grid, draw the graph of  $y = \frac{1}{2}x - 1$  for values of x from -2 to 3



(2)

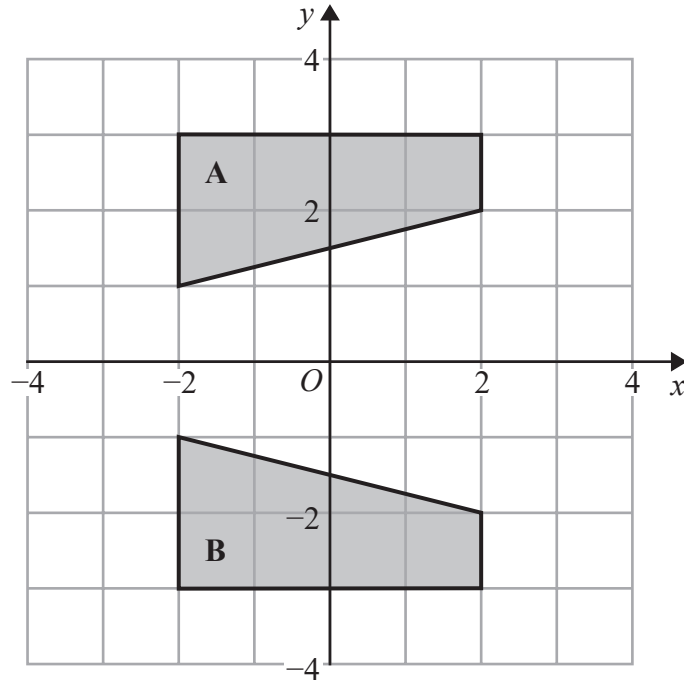
(c) Use your graph to find the value of x when  $y = 0.3$

Draw a line across from 0.3 on the y axis to the line then down to the x axis

x = .....

(1)

(Total for Question 13 is 5 marks)



Describe fully the single transformation that maps shape **A** onto shape **B**.

Types of transformation include enlargement, rotation, reflection and translation

(Total for Question 14 is 2 marks)

15 The ratio of the cost of one metre of cotton fabric to the cost of one metre of silk fabric is 2 : 5

Complete the table of costs.

$$\frac{6}{2} \times 5$$

Dividing by 2 works out the worth of 1 part of the ratio then multiplying by 5 works out the worth of 5

6m is 3 times 2m so multiply the costs by 3

	2 m	6 m	8 m	9 m
cotton fabric	£6			
silk fabric				

(Total for Question 15 is 3 marks)

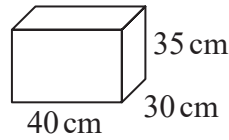
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16 Chloe has a van.

She is going to use the van to deliver boxes.  
Each box is a cuboid, 40 cm by 30 cm by 35 cm.



The space for boxes in the van has

- maximum length 2.4 m
- maximum width 1.5 m
- maximum height 1.4 m

The space for boxes is empty.  
Chloe wants to put as many boxes as possible into the van.

She can put 3 boxes into the van in one minute.  
Assume that the space for boxes is in the shape of a cuboid.

- (a) Work out how many minutes it should take Chloe to put as many boxes as possible into the van.

Convert the maximum dimensions into centimetres. There are 100cm in 1m. Then work out how many boxes can fit along each dimension. Try to get a whole number of boxes along each dimension as to fit as many as possible (35cm doesn't go into 2.4m a whole number of times for example). Multiply the number of boxes which can fit along the length by the number along the width and the number along the height to get the total number of boxes. Divide the result by 3 to work out how many minutes it will take

..... minutes  
(4)

The space for boxes might **not** be in the shape of a cuboid.

- (b) Explain how this could affect the time it would take Chloe to put as many boxes as possible into the van.

The maximum dimensions are given. If its not a cuboid, the space would have less volume

(1)

(Total for Question 16 is 5 marks)

17 (a) Factorise  $4m + 12$

Find the highest common factor of both terms and bring this out as a factor. Leave the rest in brackets

(1)

expression	<del>equation</del>	<del>formula</del>	identity
inequality	term	<del>factor</del>	<del>multiple</del>

(b) Choose two words from the box above to make this statement correct.

$5y$  is a ..... in the .....  $3x + 5y$

(2)

(Total for Question 17 is 3 marks)

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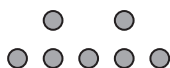
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18 Here is a sequence of patterns made with counters.



pattern number 1



pattern number 2



pattern number 3

(a) Find an expression, in terms of  $n$ , for the number of counters in pattern number  $n$ .

$x$  is what the sequence increases by each time.  $y$  is what needs to be added to adjust the sequence of  $xn$  to get the numbers of counters shown in the pattern

$xn + y$   
(2)

Bayo has 90 counters.

(b) Can Bayo make a pattern in this sequence using all 90 of his counters?  
You must show how you get your answer.

Set the expression equal to 90 so we can work out what pattern number  $n$  would have 90 counters.  $n$  needs to be a whole number otherwise 90 isn't a term in the sequence

(2)

(Total for Question 18 is 4 marks)

19 The table shows information about the heights of 80 children.

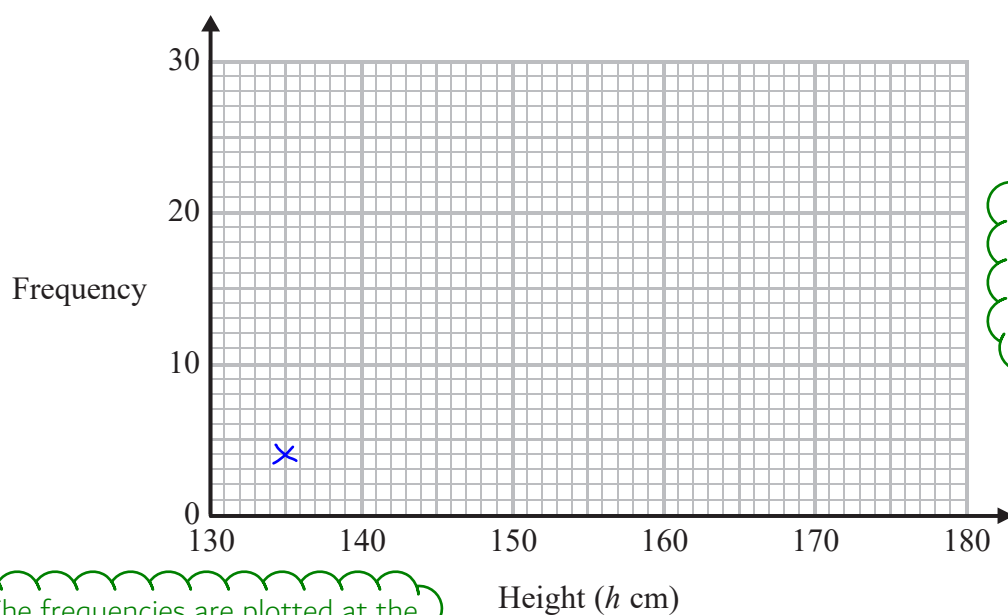
Height ( $h$ cm)	Frequency
$130 < h \leq 140$	4
$140 < h \leq 150$	11
$150 < h \leq 160$	24
$160 < h \leq 170$	22
$170 < h \leq 180$	19

(a) Find the class interval that contains the median.

Using the formula  $(n + 1)/2$  works out which data point is the median. Then create a cumulative frequency column. As soon as it goes above the number of the data point, that class interval contains the median

(1)

(b) Draw a frequency polygon for the information in the table.



Once all the points are plotted, connect them all up with a series of straight lines

The frequencies are plotted at the midpoint of each class interval

(2)

(Total for Question 19 is 3 marks)

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20 In London, 1 litre of petrol costs 108.9p  
In New York, 1 US gallon of petrol costs \$2.83

1 US gallon = 3.785 litres  
£1 = \$1.46

In which city is petrol better value for money, London or New York?  
You must show your working.

Convert the dollars per gallon for the petrol in New York into pence per litre so it can be compared to the price in London

(Total for Question 20 is 3 marks)

21 A gold bar has a mass of 12.5 kg.

The density of gold is 19.3 g/cm<sup>3</sup>

Work out the volume of the gold bar.  
Give your answer correct to 3 significant figures.

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

The mass needs to be converted into grams. This needs to be done as the unit of density is in terms of grams, not kilograms

..... cm<sup>3</sup>

(Total for Question 21 is 3 marks)



22 There are only blue pens, green pens and red pens in a box.

The ratio of the number of blue pens to the number of green pens is 2 : 5

The ratio of the number of green pens to the number of red pens is 4 : 1

There are less than 100 pens in the box.

What is the greatest possible number of red pens in the box?

Both ratios have green in common. Combine the ratios together into one ratio by making both have the same number of parts for green. Simplify the combined ratio if possible. The number of parts in the combined ratio (in its simplest form) is the least number of total pens. Work out how many lots of this least amount would give the greatest number less than 100. Multiply the number of red pens in the combined ratio by the same amount to work out the greatest number of red pens

(Total for Question 22 is 3 marks)

23 (a) Find the value of the reciprocal of 1.6  
Give your answer as a decimal.

Reciprocal means 1 over the number

(1)

Jess rounds a number,  $x$ , to one decimal place.  
The result is 9.8

(b) Write down the error interval for  $x$ .

The resolution of one decimal place is 0.1. Dividing this by 2 then adding and subtracting this from 9.8 gives the upper and lower bounds for  $x$

$9.75 \leq x < 9.85$

(2)

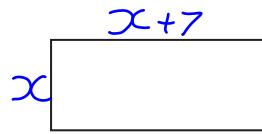
(Total for Question 23 is 3 marks)

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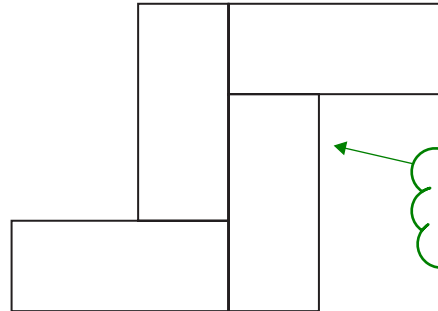
24 Here is a rectangle.



We don't know the width of the rectangle so we can label this as  $x$ . The length is 7cm longer than this so it is  $x + 7$

The length of the rectangle is 7 cm longer than the width of the rectangle.

4 of these rectangles are used to make this 8-sided shape.



Label the length of each of the sides in this diagram in terms of  $x$

The perimeter of the 8-sided shape is 70 cm.

Work out the area of the 8-sided shape.

Add together all of the side lengths in terms of  $x$  to get an expression for the perimeter. Make an equation by setting this equal to 70cm. Rearrange and solve the equation to find the width,  $x$ . Then work out the length of one of the rectangles. Area of rectangle = length  $\times$  width. Once we have the area of one of the rectangles, this can be used to work out the total area of the shape

..... cm<sup>2</sup>

(Total for Question 24 is 5 marks)

- 25 Work out  $(13.8 \times 10^7) \times (5.4 \times 10^{-12})$   
Give your answer as an ordinary number.

Type it into the calculator

The calculator should give the result in standard form, not as an ordinary number

.....  
(Total for Question 25 is 2 marks)

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26 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	Mel	Tom
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

- (a) Whose results will give the best estimate for the probability that the drawing pin will land point up?  
Give a reason for your answer.

The more times it is dropped,  
the more accurate the estimate

(1)

Stuart is going to drop the drawing pin twice.

- (b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

Point up AND point down, so the probabilities of each event should be multiplied together. To work out an estimate for the probability of point up, work out the fraction of the total drops which were point up

(2)

(Total for Question 26 is 3 marks)

27 Solve the simultaneous equations

$$\begin{aligned}x + 3y &= 12 \\5x - y &= 4\end{aligned}$$

Multiply one of the equations to get the same magnitude of x or y as the other equation. Then add or subtract the new equation and one of the original equations to eliminate either x or y. Then rearrange to find either x or y. Substitute the found value into one of the original equations then rearrange to find the other unknown

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(Total for Question 27 is 3 marks)

**TOTAL FOR PAPER IS 80 MARKS**

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