

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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Tuesday 11 June 2019

Morning (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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.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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Write 478 to the nearest hundred.

There is a 4 in the hundreds place. There is a 7 in the next place and this causes the 4 to round up to a 5. Everything after the hundreds is then ignored and is set to 0

500

(Total for Question 1 is 1 mark)

- 2 Write down a multiple of 8 that is between 41 and 60

$8 \times 6 = 48$ so 48 is a multiple of 8

48

(Total for Question 2 is 1 mark)

- 3 Change 1.5 kilometres to metres.

1 kilometre = 1000 metres. So multiplying the 1.5 kilometres by 1000 converts it to metres

1500

metres

(Total for Question 3 is 1 mark)

- 4 Here is a list of numbers.

4 6 9 10 15 27 30 40

From the list, write down all the numbers that are powers of 3

$3^1 = 3$
 $3^2 = 9$
 $3^3 = 27$
 $3^4 = 81$

9, 27

(Total for Question 4 is 1 mark)

- 5 Write 19% as a fraction.

Percentage is out of 100

$\frac{19}{100}$

(Total for Question 5 is 1 mark)

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6 Work out 20% of 80

$$\frac{20}{100} \times 80$$

Putting the 20% over 100 converts it to a fraction. Multiplying this fraction by 80 finds 20% of 80

..... 16

(Total for Question 6 is 2 marks)

7 There are four types of counter in a bag.

The table shows the number of each type of counter in the bag.

Type of counter	red circle	green circle	red square	green square
Number of counters	16	26	11	7

There are more green counters than red counters.

How many more?

$$16 + 11 = 27$$

$$26 + 7 = 33$$

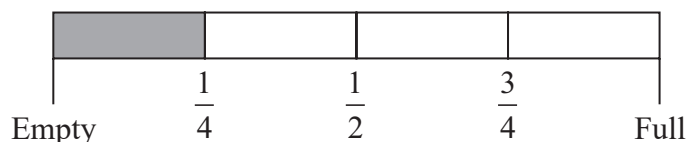
$$33 - 27$$

Adding the 15 red circles and 11 red squares finds that there are 27 red counters. Adding the 26 green circles and 7 green squares finds that there are 33 green counters. Subtracting the 27 red counters from the 33 green counters finds that there are 6 more green counters

..... 6

(Total for Question 7 is 2 marks)

8 Here is the gauge for the fuel tank of a car.



The fuel tank holds 52 litres of fuel when the tank is full.

The tank is $\frac{1}{4}$ full of fuel.

Work out how many more litres of fuel are needed to fill the tank.

$$\frac{1}{4} \times 52$$

This works out that $\frac{1}{4}$ of the 52 litres is 13 litres. So there are 13 litres of fuel in the tank

$$52 - 13$$

Subtracting the 13 litres in the tank from the 52 litres when full works out that 39 more litres are needed

..... 39

litres

(Total for Question 8 is 3 marks)

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9 Simplify $4e + 6f + 7e - f$

Collecting like terms. $4e + 7e = 11e$ and $6f - f = 5f$

$$11e + 5f$$

(Total for Question 9 is 2 marks)

10 Bill has 400 counters in a bag.

He gives

35 of the counters to Sameena

50 of the counters to Henry

75 of the counters to Lucas

What fraction of the 400 counters is left in Bill's bag?

Give your fraction in its simplest form.

$$400 - 35 - 50 - 75$$

Subtracting the counters given from the 400 counters works out that 240 counters are left

$$\frac{240}{400}$$

Expressing the 240 counters left as a fraction of the 400 counters

The calculator can simplify the fraction

$$\frac{3}{5}$$

(Total for Question 10 is 3 marks)

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11 The table shows the costs of sending a parcel by the Express service and by the Rapid service.

Type of service	Cost
Express	£15.25
Rapid	£35.38

Brendan has to send 12 parcels.

It will be cheaper to send the parcels by the Express service than by the Rapid service.

(a) How much cheaper?

15.25 × 12 = 183

Multiplying the cost of the Express by the 12 parcels works out that the cost of sending 12 parcels by the Express service is £183

35.38 × 12 = 424.56

Multiplying the cost of the Rapid by the 12 parcels works out that the cost of sending 12 parcels by the Rapid service is £424.56

424.56 - 183

Subtracting the cost of sending 12 parcels by the Express service from the cost of sending 12 parcels by the rapid service works out the difference is £241.56. This is how much cheaper it is

£ 241.56
(3)

Luke wants to send 21 parcels by the Express service.

He does the calculation 20 × £15 = £300 to estimate the cost.

(b) Explain why Luke’s calculation shows the actual cost will be more than £300

21 and £15.25 were rounded down

So the estimated cost is too low

(1)

(Total for Question 11 is 4 marks)

12 Ali, Ben and Cathy share an amount of money in the ratio 6 : 9 : 10

What fraction of the money does Ben get?

$6 + 9 + 10$ ← Adding all the parts of the ratio works out that there are 25 parts in total in the ratio

Ben gets 9 out of the 25 parts

$\frac{9}{25}$

(Total for Question 12 is 2 marks)

13 The first term of a sequence of numbers is 24
The term-to-term rule of this sequence is 'add 8'

Josie says,

"No number in this sequence is in the 5 times table."

(a) Give an example to show that Josie is wrong.

Counting in 8s from 24 finds that 40 is in the sequence, which is in the 5 times table. 24, 32, 40

40

(1)

(b) Is 85 a number in this sequence?
Give a reason for your answer.

32, 40, 48, 56, 64, 72, 80, 88 ← Continuing to count in 8s shows that the sequence goes past 85

No

(1)

(Total for Question 13 is 2 marks)

14 Find the value of $\frac{5.27 + 3.5}{7.9 - 4.36}$

Give your answer as a decimal.

Write down all the figures on your calculator display.

Typing it into the calculator exactly as it is above. Formatting the answer as a decimal

..... 2.47740113

(Total for Question 14 is 2 marks)

- 15 You can use this rule to work out the total hire charge, in pounds (£), for hiring a 3D printer for a number of weeks.

$$\text{Total hire charge (£)} = \text{number of weeks} \times 70 + 50$$

Mia wants to hire a 3D printer for 4 weeks.

- (a) Work out the total hire charge.

$4 \times 70 + 50$ ← Substituting 4 for the number of weeks in the formula

£..... 330
(2)

Zahir hires a 3D printer.
The total hire charge is £680

- (b) For how many weeks does Zahir hire the 3D printer?

$680 = n \times 70 + 50$ ← Substituting £680 for the total hire charge. Let n be the number of weeks

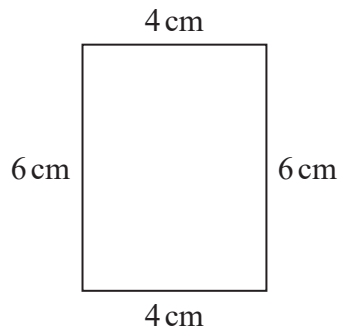
$630 = n \times 70$ ← Subtracting 50 from both sides eliminates the +50 on the right

Dividing both sides by 70 gets n on its own, which is the number of weeks

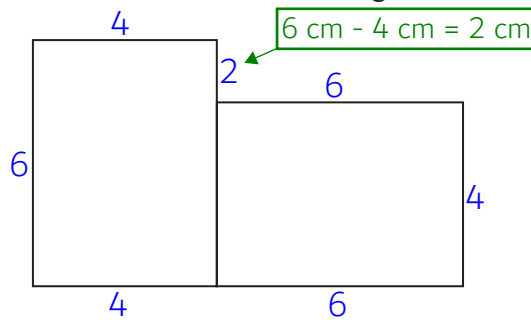
..... 9 weeks
(2)

(Total for Question 15 is 4 marks)

16 Here is a rectangle.



The 6-sided shape below is made from two of these rectangles.



Work out the perimeter of this 6-sided shape.

$$4 + 2 + 6 + 4 + 6 + 4 + 6 \leftarrow \text{Adding all the outside sides works out the perimeter}$$

..... 32 cm

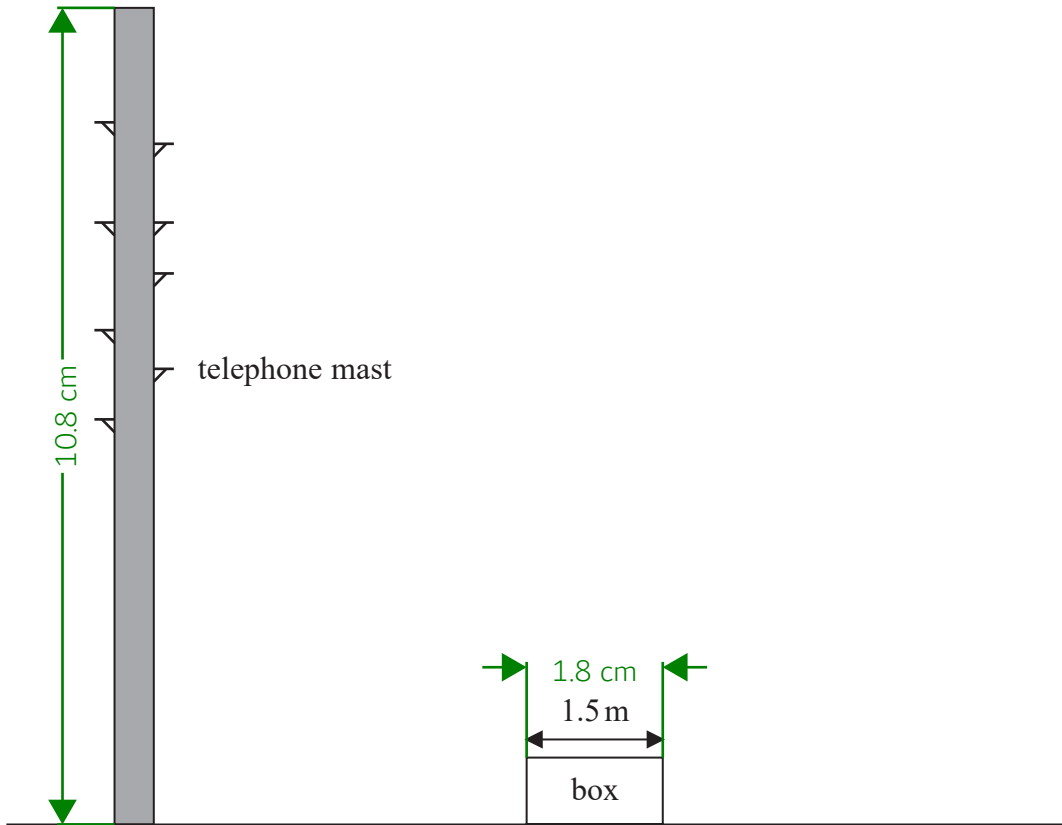
(Total for Question 16 is 3 marks)

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17 The accurate scale diagram shows a telephone mast and a box.



The box has a real width of 1.5 metres.

Find an estimate for the real height, in metres, of the telephone mast.

10.8 ÷ 1.8

Dividing the measured height of the telephone mast by the measured width of the box works out that the telephone mast is 6 times taller than the box is wide

1.5 × 6

Multiplying the real width of the box by 6 estimates the real height of the telephone mast

..... 9 metres

(Total for Question 17 is 2 marks)

18 The table shows information about the numbers of points scored by 30 students in a quiz.

Number of points		Frequency	
0	×	4	= 0
1	×	3	= 3
2	×	7	= 14
3	×	5	= 15
4	×	6	= 24
5	×	5	= 25

(a) Find the modal number of points.

2 has the highest frequency so is the modal number of points

2

(1)

(b) Work out the total number of points scored.

$$0 + 3 + 14 + 15 + 24 + 25$$

Multiplying each of the number of points by the frequencies gives a total number of points for each row. Then adding all of these totals gives the overall total

81

(2)

(Total for Question 18 is 3 marks)

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19 Make x the subject of the formula $y = 2x + 4$

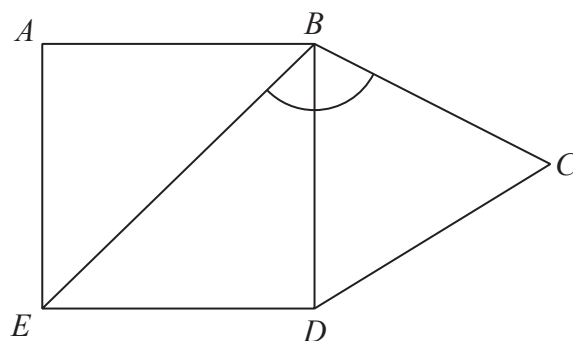
$y - 4 = 2x$ ← Subtracting 4 from both sides gets the x term on its own

Dividing both sides by 2 gets x on its own

$x = \frac{y - 4}{2}$

(Total for Question 19 is 2 marks)

20 The diagram shows a square $ABDE$ and an equilateral triangle BCD .



Work out the size of angle EBC .

$90 \div 2 = 45$ ← Each angle of the square is 90° . BE is a line of symmetry so cuts angle ABD in half. So angle EBD is 45°

$180 \div 3 = 60$ ← There are 180° in total in a triangle. As it is equilateral, all 3 angles are equal. Dividing the 180° by 3 works out that angle DBC is 60°

$45 + 60$ ← Adding angle EBD and angle DBC gives angle EBC

..... 105

(Total for Question 20 is 2 marks)

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21 Liz goes on holiday to South Africa.

Liz wants to change £850 into South African rand.
She wants to get as many 200 rand notes as possible.

The exchange rate is £1 = 18.53 rand.

Work out the greatest number of 200 rand notes that Liz can get for £850

850×18.53 ← Multiplying the £850 by the 18.53 rand each £1 is worth works out that £850 = 15750.5 rand
 $15750.5 \div 200$ ← Dividing the 15750.5 rand by the 200 rand notes works out how many can be got

78.7... is rounded down to 78 as there needs to be a whole number and 79 is too many

78

(Total for Question 21 is 3 marks)

22 In October Sally drove 560 miles in her car.

The car travelled 34.5 miles for each gallon of petrol used.

Petrol cost £1.08 per litre.

1 gallon = 4.55 litres.

Work out the cost of the petrol the car used in October.

$560 \div 34.5$ ← Dividing the 560 miles by the 34.5 miles for each gallon works out that 16.2... gallons of petrol was used
 $16.2... \times 4.55$ ← Multiplying the 16.2... gallons by the 4.55 litres each gallon is works out that 73.8... litres of petrol was used
 $73.8... \times 1.08$ ← Multiplying the 73.8... litres by the £1.08 cost of each litre works out the cost of the petrol used

£79.763... is rounded to the nearest penny

£79.76

(Total for Question 22 is 4 marks)

23 Costcorp sells packets of mints to shop owners.

On Monday three shop owners buy mints from Costcorp.

Each shop owner buys small packets, medium packets and large packets of mints.

Alan buys 400 packets of mints.

32% are small packets.

40% are large packets.

Beryl buys 500 packets of mints.

$\frac{3}{10}$ are small packets.

$\frac{1}{10}$ are large packets.

Charlie buys 150 small packets of mints so that

number of small packets : number of medium packets = 3 : 4

Work out the total number of medium packets of mints these shop owners buy.

You must show all your working.

$$100 - 32 - 40$$

Subtracting the 32% which are small and the 40% which are large from 100% works out that 28% of the packets Alan buys are medium

$$\frac{28}{100} \times 400 = 112$$

Putting the 28% over 100 converts it to a fraction. Multiplying this fraction by the 400 packets Alan buys works out that Alan buys 112 medium packets

$$1 - \frac{3}{10} - \frac{1}{10}$$

Subtracting the $\frac{3}{10}$ which are small and the $\frac{1}{10}$ which are large from 1 lot of packets works out that $\frac{6}{10}$ of the packets Beryl buys are medium

$$\frac{6}{10} \times 500 = 300$$

Doing $\frac{6}{10}$ of the 500 packets Beryl buys works out that Beryl buys 300 medium packets

$$150 \div 3$$

Dividing the 150 small packets Charlie buys by the 3 parts of the ratio which represent them works out that 1 part of the ratio is worth 50 packets

$$50 \times 4 = 200$$

Multiplying the value of 1 part of the ratio by the 4 parts which represent the medium packets works out that Charlie buys 200 medium packets

$$112 + 300 + 200$$

Adding the 112 medium packets which Alan buys and the 300 medium packets which Beryl buys and the 200 medium packets which Charlie buys works out the total number of medium packets they buy

612

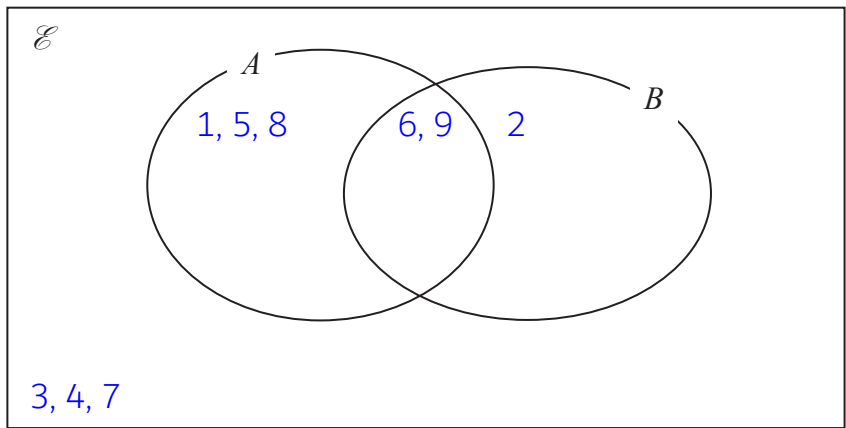
(Total for Question 23 is 5 marks)

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- 24 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
 $A = \{1, 5, 6, 8, 9\}$
 $B = \{2, 6, 9\}$



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

(3)

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

(b) Find the probability that the number is in the set $A \cap B$

2 out of the 9 numbers (6 and 9) are in the intersection of A and B

$\frac{2}{9}$

(2)

(Total for Question 24 is 5 marks)

- 25 Katy invests £200 000 in a savings account for 4 years.
The account pays compound interest at a rate of 1.5% per annum.

Calculate the total amount of interest Katy will get at the end of 4 years.

$$\frac{100 + 1.5}{100}$$

Adding the 1.5% to 100% expresses the percentage it increases to each year. Dividing this by 100 converts it to the decimal multiplier 1.015

$$200000 \times 1.015^4$$

Multiplying the £200000 by 1.015^4 increases it by 1.5% 4 times. So there is £212272.71 in the account after 4 years

$$212272.71 - 200000$$

Subtracting the original £200000 from the £212272.71 in the account after 4 years works out that the interest is £12272.71

£..... 12272.71

(Total for Question 25 is 3 marks)

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26 The table shows information about the heights of 80 plants.

Height (h cm)	Frequency
$10 < h \leq 20$	7
$20 < h \leq 30$	13
$30 < h \leq 40$	14
$40 < h \leq 50$	12
$50 < h \leq 60$	16
$60 < h \leq 70$	18

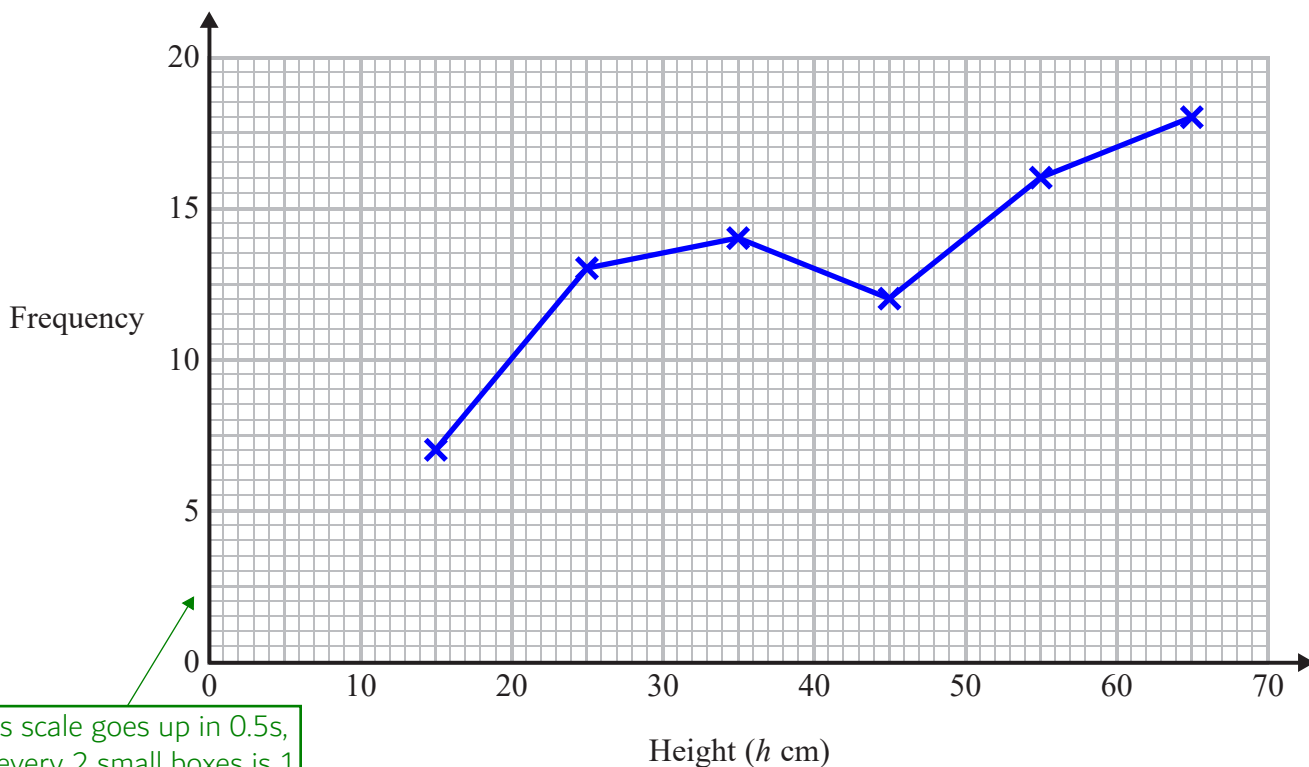
(a) Find the class interval that contains the median.

Method is on the next page

$40 < h \leq 50$

(1)

(b) On the grid, draw a frequency polygon for the information in the table.



This scale goes up in 0.5s, so every 2 small boxes is 1

(2)

Plotting the frequencies at the midpoint of each interval then joining them up with a series of straight lines

(Total for Question 26 is 3 marks)

$$\frac{80 + 1}{2}$$

The median is the middle height when they are all put in order. Doing the mean of plant number 1 and plant number 80 works out that plant 40.5 is the median, which is halfway between the 40th and 41st

$$40 - 7$$

Subtracting the first 7 plants from 40 works out that another 33 plants need to be counted to get to the 40th

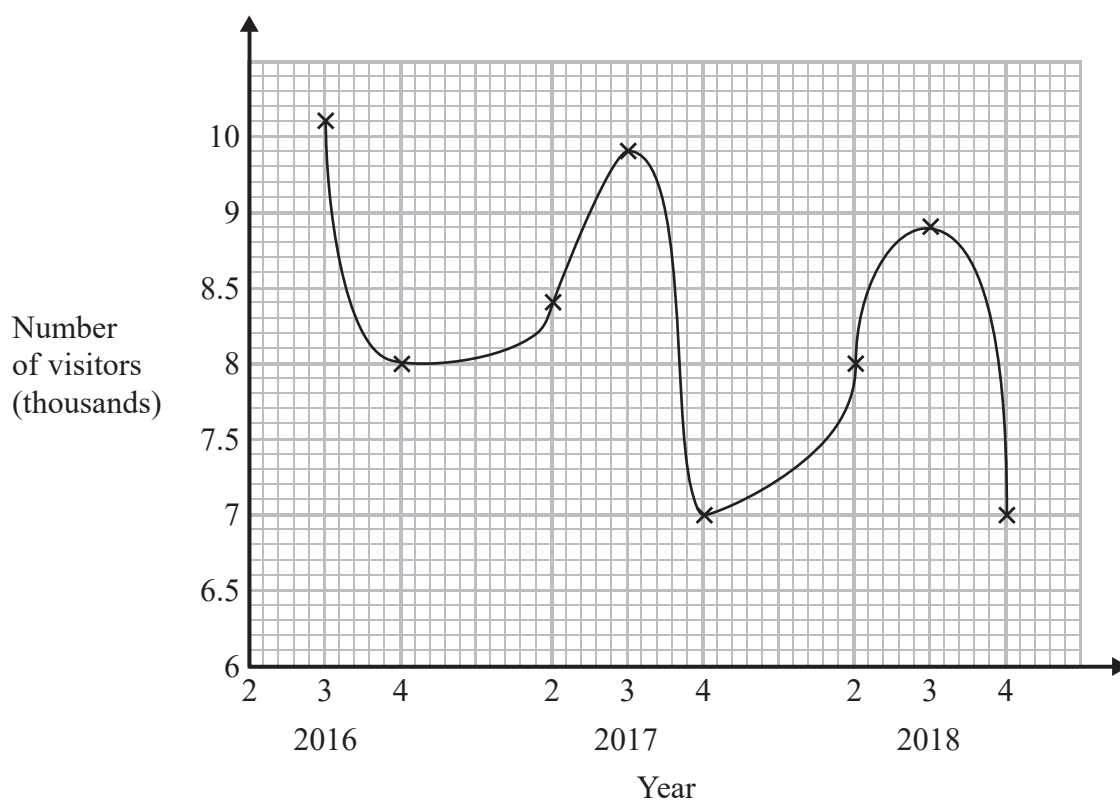
$$33 - 13$$

Subtracting the next 13 plants from 33 works out that another 20 plants need to be counted to get to the 40th

$$20 - 14 = 6$$

Subtracting the next 14 plants from 20 works out that another 6 plants need to be counted to get to the 40th. The next interval has 12 plants, which is more than the 6 which needs to be counted, so both the 40th and 41st must be in the $40 < h \leq 50$ interval

- 27 Sean has drawn a time series graph to show the numbers, in thousands, of visitors to a fun park.



Write down two things that are wrong or could be misleading with this graph.

- 1 9.5 is missing on the vertical axis

The scale should go up by the same amount for each division

- 2 Not clear what the numbers on the horizontal axis mean

It is not clear what the 2, 3, 4 represent

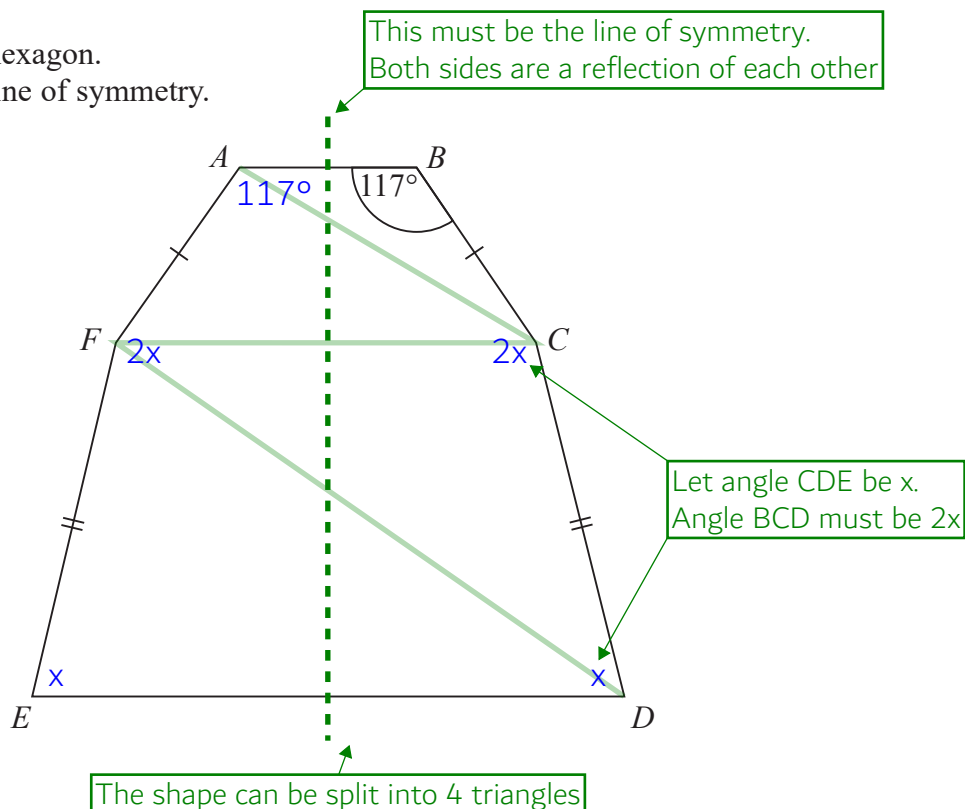
(Total for Question 27 is 2 marks)

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- 28 The diagram shows a hexagon.
The hexagon has one line of symmetry.



$$FA = BC$$

$$EF = CD$$

$$\text{Angle } ABC = 117^\circ$$

$$\text{Angle } BCD = 2 \times \text{angle } CDE$$

Work out the size of angle AFE .
You must show all your working.

$$180 \times 4 = 720$$

There are 180° in a triangle. There are 4 triangles in the hexagon. So there must be 720° in total in the hexagon

$$117 + 117 + 2x + 2x + x + x$$

Adding all the angles in the hexagon to express the total of the angles in terms of x

$$234 + 6x = 720$$

Collecting like terms. The expression of the total of the angles must be equal to 720°

$$6x = 486$$

Subtracting 234 from both sides gets the x term on its own

$$x = 81$$

Dividing both sides by 6 gets x on its own

$$81 \times 2$$

Angle AFE is $2x$

162

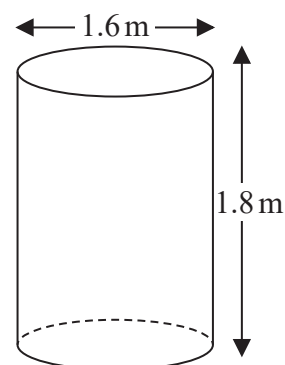
(Total for Question 28 is 4 marks)

29 Jeremy has to cover 3 tanks completely with paint.

Each tank is in the shape of a cylinder with a top and a bottom.
The tank has a diameter of 1.6 m and a height of 1.8 m.

Jeremy has 7 tins of paint.
Each tin of paint covers 5 m^2

Has Jeremy got enough paint to cover completely the 3 tanks?
You must show how you get your answer.



$$7 \times 5 = 35$$

Multiplying the 7 tins by the 5 m^2 covered by each tin works out that there is enough paint to cover 35 m^2

$$1.6 \div 2$$

The radius is half of the diameter so is 0.8 m

$$\pi \times 0.8^2 = 2.01... \text{ (A)}$$

Area of circle = $\pi \times \text{radius}^2$. So the area of each circular face is $2.01... \text{ m}^2$. Storing this on the calculator as A

$$\pi \times 1.6 \times 1.8$$

The curved face can be considered as a curved rectangle. Area of rectangle = base \times height. The base is the circumference. Circumference = $\pi \times$ diameter. Then multiplying this by the height works out that each curved face is $9.04... \text{ m}^2$

$$9.04... + 2.01... + 2.01...$$

Adding the area of the curved face and two lots of the area of each circular face works out that the surface area of each tank is $13.06... \text{ m}^2$. Using the exact stored value as the area of the circular faces

$$13.06... \times 3 = 39.2...$$

Multiplying the surface area of one tank by 3 works out that the total area of paint needed for 3 tanks is $39.2... \text{ m}^2$

No

The 35 m^2 which 7 tins can cover is not enough to cover $39.2... \text{ m}^2$

(Total for Question 29 is 5 marks)

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30 Solve the simultaneous equations

$$3x - 4y = 11 \leftarrow \text{1st equation}$$

$$9x + 2y = 5 \leftarrow \text{2nd equation}$$

$$9x - 12y = 33 \leftarrow \text{Multiplying all terms on both sides of the 1st equation by 3 gets the same number of } x \text{ as the 2nd equation. This forms the 3rd equation}$$

$$14y = -28 \leftarrow \text{Subtracting the 3rd equation from the 2nd equation cancels out the } x \text{ term and gets an equation just in terms of } y. \text{ Then dividing both sides by 14 finds that } y = -2$$

$$3x - 4 \times -2 = 11 \leftarrow \text{Substituting } -2 \text{ for } y \text{ in the 1st equation}$$

$$3x = 3 \leftarrow \text{Adding } 4 \times -2 \text{ to both sides gets the } x \text{ term on its own. Then dividing both sides by 3 finds that } x = 1$$

$$x = \dots\dots\dots 1 \dots\dots\dots$$

$$y = \dots\dots\dots -2 \dots\dots\dots$$

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS