Centre Number   Candidate Number

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

Monday 12 November 2018

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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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 a number in each box to make the calculation correct.

(i) 56.3 + $\boxed{43.7}$ = 100 ← 100 - 56.3

(1)

(ii) $\dfrac{2}{7}$ + $\boxed{\dfrac{5}{7}}$ = 1 ← 1 - 2/7

(1)

(Total for Question 1 is 2 marks)

2 Write 3% as a fraction.

Percent means out of 100

$\dfrac{3}{100}$

(Total for Question 2 is 1 mark)

3 Find $\sqrt{1.44}$

Type into the calculator

1.2

(Total for Question 3 is 1 mark)

4 Work out $\dfrac{1}{8}$ of 720

1/8 x 720

90

(Total for Question 4 is 1 mark)

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1/8 x 720

5 Here is a 3-D shape.
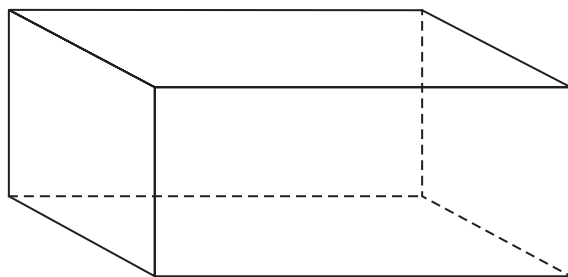
(a) Write down the name of this 3-D shape.

.... Cuboid
(1)

(b) Write down the number of edges of this 3-D shape.

Count them on the diagram

.... 12
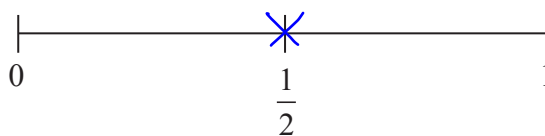**(1)**

(Total for Question 5 is 2 marks)

6 An ordinary fair dice is thrown once.

(a) On the probability scale below, mark with a cross (×) the probability that the dice lands on an odd number.

The odd possibilities are 1, 3 and 5. This is 3 numbers out of 6. 3/6 simplifies to 1/2

$$0 \qquad \frac{1}{2} \qquad 1$$

(1)

(b) Write down the probability that the dice lands on a number greater than 4

The numbers greater than 4 are 5 and 6. This is 2 numbers out of 6. There is no need to simplify the fraction

$\frac{2}{6}$

....
(1)

(Total for Question 6 is 2 marks)

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7 Shaun is 1.88 m tall.

David is 6 cm taller than Shaun.

How tall is David?

> There are 100cm in 1m so 1.88m is 188cm as 1.88 x 100 = 188.
> 188cm + 6cm = 194cm

194cm

(Total for Question 7 is 2 marks)

8 2 pens cost £2.38
5 folders cost £5.60

Ben wants to buy 20 pens and 20 folders.
He only has £50

Does Ben have enough money to buy 20 pens and 20 folders?
You must show how you get your answer.

$$£2.38 \times 10 + £5.60 \times 4 = £46.20$$

> 2 x 10 = 20 so 10 lots of 2 pens need to be bought

> 5 x 4 = 20 so 4 lots of 5 folders need to be bought

> The total cost of 20 pens and 20 folders
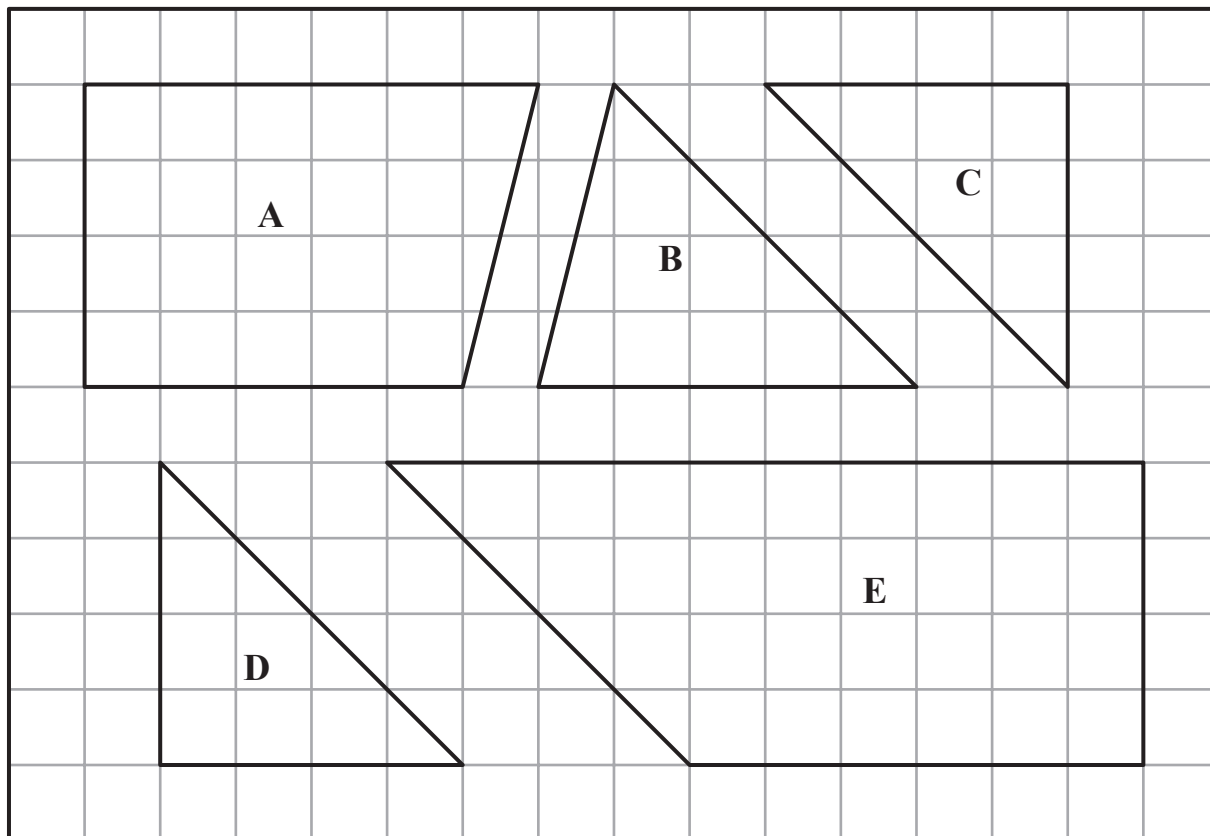
Yes

> £46.20 is less than the £50 he has

(Total for Question 8 is 4 marks)

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9 The diagram shows five shapes on a centimetre grid.

(a) Write down the name of shape **E**.

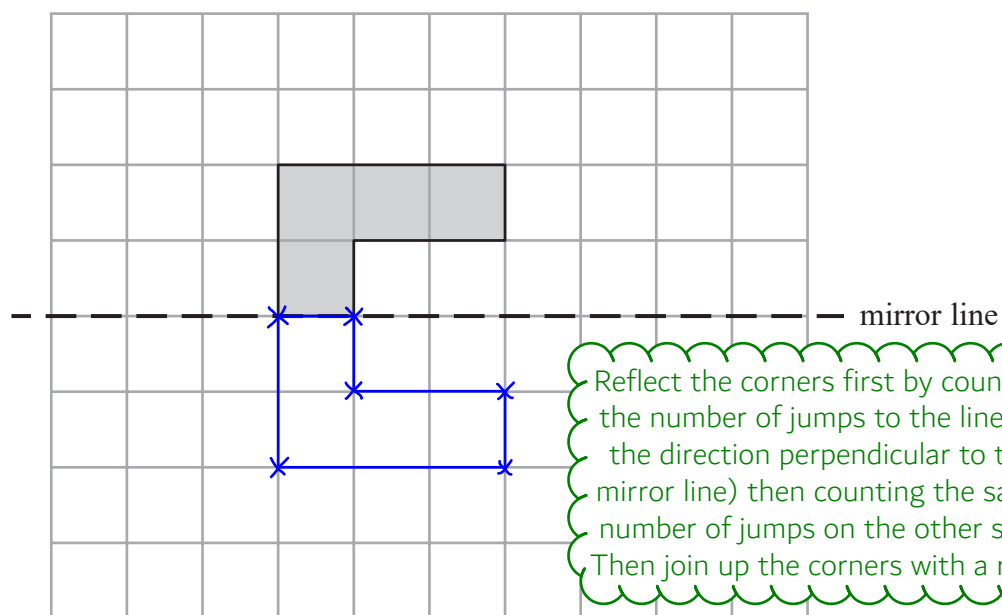...................................... Trapezium

(1)

Two of the shapes are congruent. ← The sides and angles are the same. It can be rotated and/or reflected

(b) Write down the letters of these two shapes.

.... C .... and .... D ....

(1)

(Total for Question 9 is 2 marks)

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10 On the grid, reflect the shaded shape in the mirror line.

mirror line

Reflect the corners first by counting the number of jumps to the line (in the direction perpendicular to the mirror line) then counting the same number of jumps on the other side. Then join up the corners with a ruler

(Total for Question 10 is 1 mark)

11 There are men and women at a meeting.

There are 28 women.
30% of the people at the meeting are men.

Work out the total number of people at the meeting.

$28 \div 0.7$

30% are men so 70% must be women as 100 - 30 = 70. 70% is 0.7 as a decimal. Total x 0.7 = 28 so total = 28 ÷ 0.7

40

(Total for Question 11 is 3 marks)

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12 Joan asked each of 60 people to name their favourite vegetable.

Here are her results.

This works out how many degrees represents 1 person

$$360 \div 60 = 6$$

Vegetable	Frequency
Peas	24
Carrots	16
Mushrooms	20

Angle

144 ← 24 x 6

96 ← 16 x 6

120 ← 20 x 6

Draw an accurate pie chart for her results.

Use a protractor to measure and draw the angles onto the chart

Carrots

Peas

Mushrooms
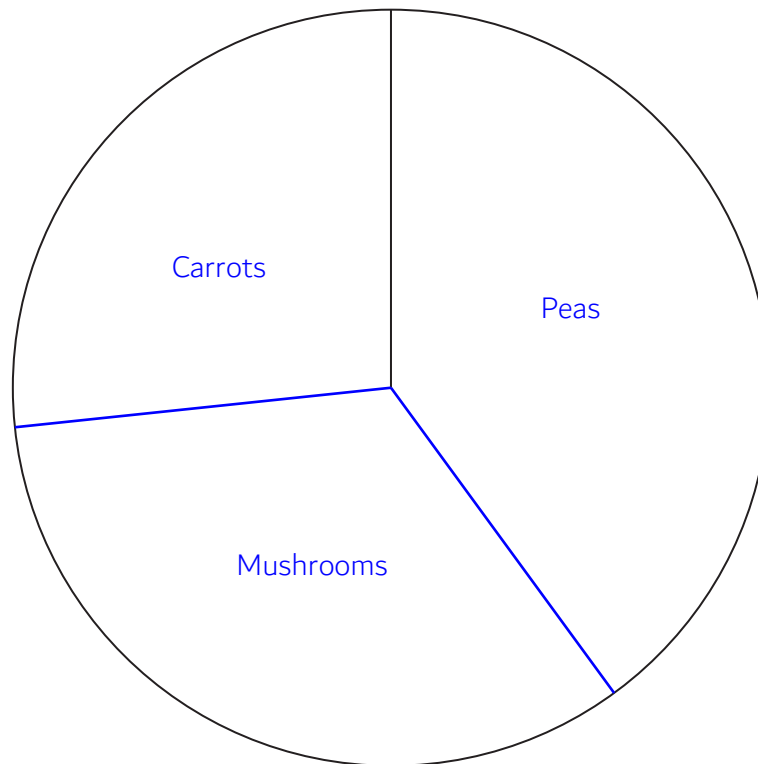
(Total for Question 12 is 3 marks)

.CG Maths.

13 Annie sold

> 45 books at £1.20 each
> 34 candles at £1.50 each
> some calendars at 90p each

She got a total of £150

Work out how many calendars Annie sold.

$$\frac{150 - 45 \times £1.20 - 34 \times £1.50}{£0.90}$$

> Subtracting the costs of 45 books and 34 candles from £150 to work out how much money was spent on the calendars. Dividing the result by £0.90 to work out how many lots of £0.90 go in and therefore how many calendars were sold
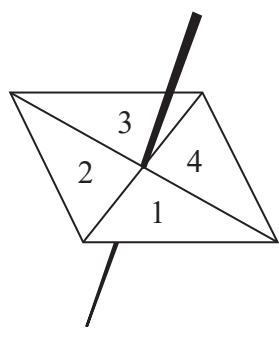
50

(Total for Question 13 is 4 marks)

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14 Here is a 4-sided spinner.

The table shows the probabilities that when the spinner is spun it will land on 1, on 3 and on 4

Number	1	2	3	4
Probability	0.2		0.4	0.1

The spinner is spun once.

(a) Work out the probability that the spinner will land on 2

$1 - 0.2 - 0.4 - 0.1$

It is certain to get either a 1, 2, 3 or 4 so all of the probabilities add to 1

.... 0.3 ....

(1)

(b) Which number is the spinner least likely to land on?

0.1 is the smallest probability

.... 4 ....

(1)

Jake is going to spin the spinner 60 times.

(c) Work out an estimate for the number of times the spinner will land on 1

60×0.2

The probability is a good estimate for the relative frequency

.... 12 ....

(2)

(Total for Question 14 is 4 marks)

.CG Maths.

15 Bert has 100 cards.
There is a whole number from 1 to 100 on each card.
No cards have the same number.

Bert puts a star on every card that has a multiple of 3 on it.
He puts a circle on every card that has a multiple of 5 on it.

Work out how many cards have both a star and a circle on them.

15, 30, 45, 60, 75, 90

All these numbers are multiples of 3 and 5 as 15 is the lowest common multiple of 3 and 5 and they are all multiples of 15

6 numbers are listed

6

(Total for Question 15 is 3 marks)

16 Write down the ratio of 450 grams to 15 grams.
Give your answer in its simplest form.

450/15 = 30

Fractions simplify in a similar way to ratios. 30 as a fraction is 30/1
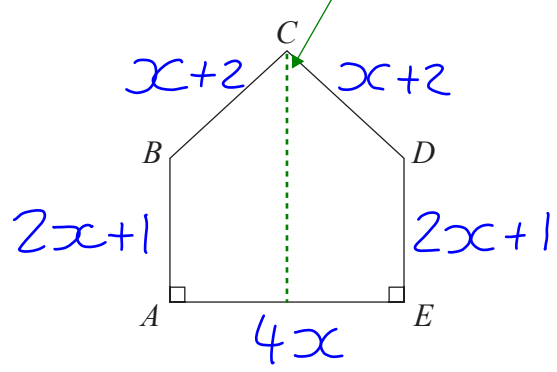
30 : 1

(Total for Question 16 is 2 marks)

.CG Maths.

17 The diagram shows a pentagon.
The pentagon has one line of symmetry.

$x+2$ $x+2$

C

B D

$2x+1$ $2x+1$

A $4x$ E

$AE = 4x$
$AB = 2x + 1$
$BC = x + 2$

All these measurements are given in centimetres.

The perimeter of the pentagon is 18 cm.

(a) Show that $10x + 6 = 18$

$4x + 2x + 1 + x + 2 + x + 2 + 2x + 1 = 18$

$10x + 6 = 18$

(3)

(b) Find the value of x.

$10x = 12$ ←

$x =$ .... 1.2 ....

(2)

(Total for Question 17 is 5 marks)

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Turn over ▶

18 Trevor buys a boat.
The cost of the boat is £14 200 plus VAT at 20%

Trevor pays a deposit of £5000
He pays the rest of the cost in 10 equal payments.

Work out the amount of each of the 10 payments.

£14200 × 1.2 = £17040

100% + 20% = 120%, which as a decimal is 1.2. Multiplying by 1.2 adds the VAT of 20%

£17040 − £5000 = £12040

Subtracting the deposit leaves the total of the 10 equal payments

£12040 ÷ 10
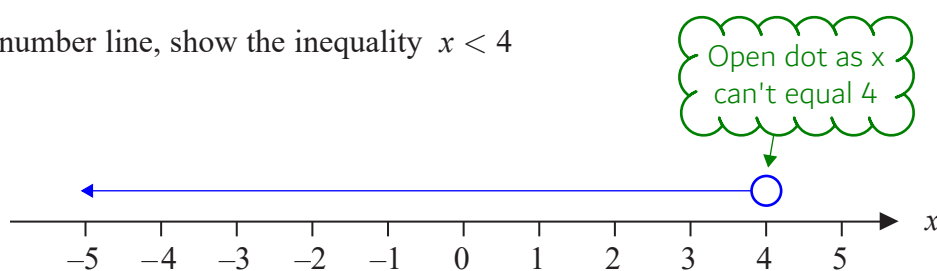
Working out the amount of one of the 10 payments

£ .... 1204 ....

(Total for Question 18 is 4 marks)

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19 (a) On the number line, show the inequality $x < 4$

Open dot as x can't equal 4

(2)

$3 < y \leqslant 7$ where y is an integer.

(b) Write down all the possible values of y.

Greater than 3 and less than or equal to 7. Integers are whole numbers

4, 5, 6, 7

(2)

(c) Solve $3x + 5 \geqslant x + 17$

$2x \geqslant 12$

Subtract x from both sides to get all the x terms on the left. Subtract 5 to get the x terms on their own

Divide both sides by 2

$x \geqslant 6$

(3)

(Total for Question 19 is 7 marks)

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20 (a) Write 7357 correct to 3 significant figures.

Only the first three figures are quoted.
All other figures become 0. The 5 rounds
to a 6 as there is a 7 in the next place

7360

(1)

(b) Work out $\dfrac{\sqrt{17 + 4^2}}{7.3^2}$

Write down all the figures on your calculator display.

Type into the calculator

0.1077981356

(2)

(Total for Question 20 is 3 marks)

21 Last year Jo paid £245 for her car insurance.
This year she has to pay £883 for her car insurance.

Work out the percentage increase in the cost of her car insurance.

$\dfrac{883 - 245}{245} \times 100$

Using the percentage change formula:
(new - old)/old x 100

260.4 %

(Total for Question 21 is 3 marks)

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22 (a) Complete this table of values for $y = x^2 + x - 4$

x	−3	−2	−1	0	1	2	3
y	2	−2	−4	−4	−2	2	8

Use table mode by pressing Menu then 3. Type in f(x) = x² + x − 4. Start: −3. End: 3. Step: 1

(2)

(b) On the grid, draw the graph of $y = x^2 + x - 4$ for values of x from −3 to 3

10 boxes = 5 so each box is worth 0.5

y is 0 at this point
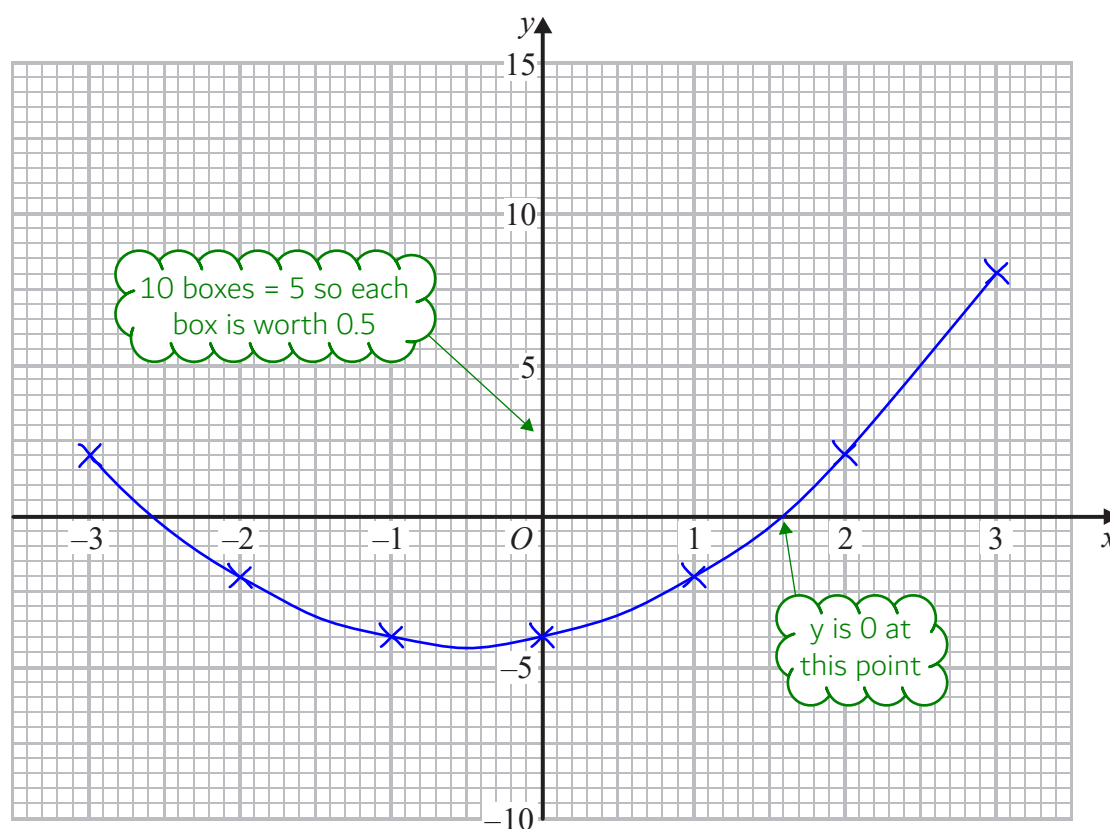
(2)

(c) Use the graph to estimate a solution to $x^2 + x - 4 = 0$

This value will depend on how you have drawn the curve
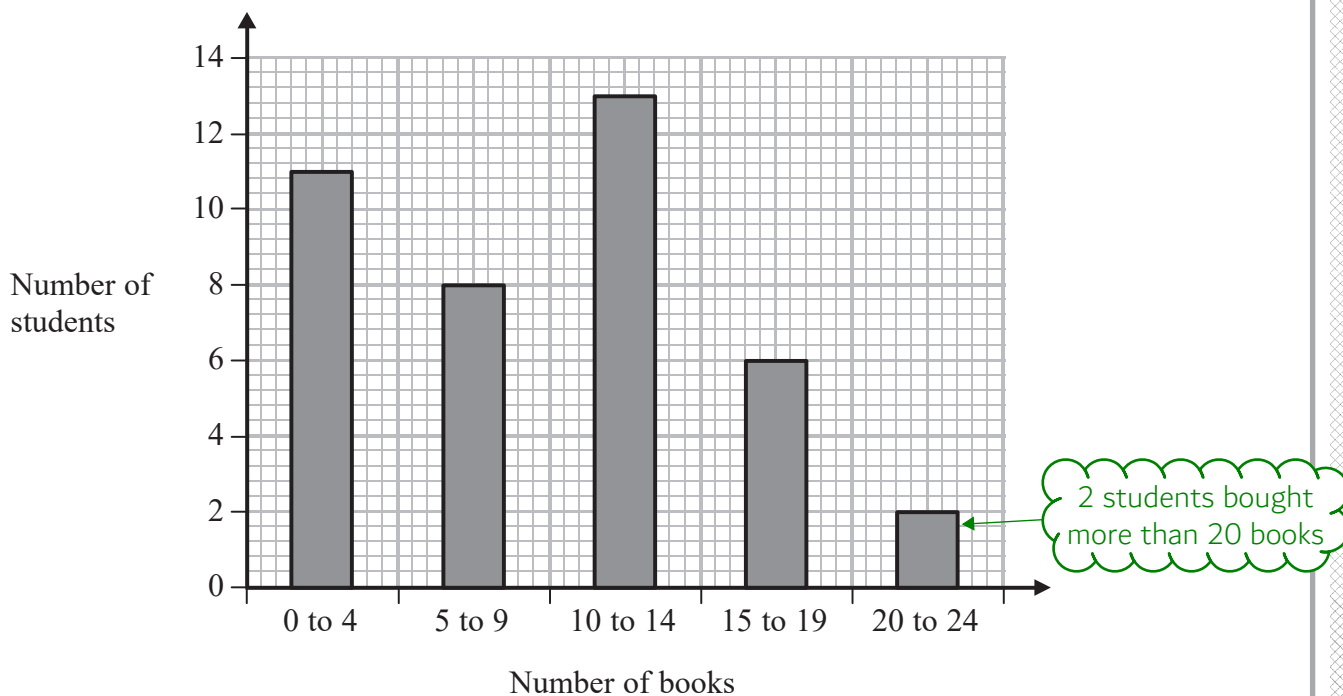
Estimate what x is when y is 0

1.6

(1)

(Total for Question 22 is 5 marks)

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Turn over ▶

23 Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.

2 students bought more than 20 books

(a) Work out the percentage of these students who bought 20 or more books.

$$\frac{2}{40} \times 100$$

2 out of the 40 students bought more than 20 books. To convert the fraction 2/40 into a percentage, multiply it by 100

.... S ....%

(2)

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(b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

$$\frac{11 \times 2 + 8 \times 7 + 13 \times 12 + 6 \times 17 + 2 \times 22}{40} = 9.5$$

Mean = total/number. To estimate the total, multiply the number of students for each category by the mid point of the number of books for that category then add together all the results. The number is 40 as there are 40 students

(4)

(Total for Question 23 is 6 marks)

24 Lara is a skier.

She completed a ski race in 1 minute 54 seconds.
The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

(a) Using this assumption, work out how long Lara should take to complete a 700 m race.
Give your answer in minutes and seconds.

$$\frac{d}{s \mid t}$$

From the formula triangle:
time = distance/speed
speed = distance/time

$$\frac{475}{60+54} = \frac{25}{6}$$

This works out the average speed in metres per second. The minute has been converted into seconds

$$\frac{700}{\left(\frac{25}{6}\right)} = 168$$

This works out the time taken for the 700m race in seconds

168/60 = 2.8 so 2 whole minutes.
2 x 60 = 120, 168 - 120 = 48 so 48 seconds in addition to the minutes

.......2....... minutes ....48....... seconds

(3)

Lara's average speed actually increases the further she goes.

(b) How does this affect your answer to part (a)?

It would take less time

700m is further than 475m so the average speed would be higher
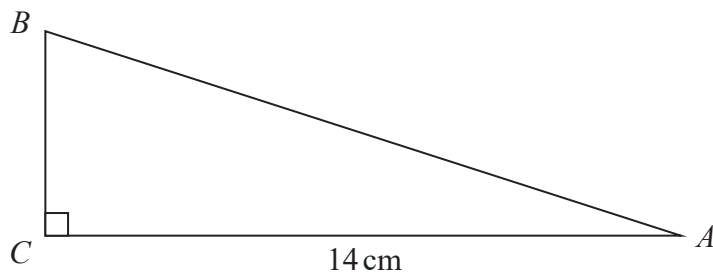
(1)

(Total for Question 24 is 4 marks)

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25 *ABC* is a right-angled triangle.

Diagram: triangle with vertex B top-left, right angle at C bottom-left, A bottom-right, with $CA = 14\,\text{cm}$.

$AC = 14\,\text{cm}$.
Angle $C = 90°$

size of angle B : size of angle $A = 3 : 2$

Work out the length of *AB*.
Give your answer correct to 3 significant figures.

$180 - 90 = 90$

There are 180 degrees in a triangle. Subtracting angle C works out the total of angle A and B

$5p = 90$, $p = 18$

$2p = 36$

There are 5 parts in total in the ratio and this represents 90 degrees. Dividing by 5 works out that 1 part is worth 18 degrees. Multiplying by 2 works out that 2 parts (angle A) are worth 36 degrees

SOH CÁH TOÁ

We have the adjacent and we are finding the hypotenuse. So the CAH formula triangle can be used

$\dfrac{A}{C \mid H}$

From the formula triangle:
hypotenuse = adjacent/cos of the angle

$\dfrac{14}{\cos 36}$ = 17.30495168

Rounded to 3 significant figures

17.3 ....cm

(Total for Question 25 is 4 marks)

26 Here are the first four terms of an arithmetic sequence.

$$5 \qquad 11 \qquad 17 \qquad 23$$

Write down an expression, in terms of *n*, for the *n*th term of the sequence.

> The sequence goes up 6 each term so it must involve 6n. The first term of 6n is 6 and we need to subtract 1 to get 5

$6n-1$

(Total for Question 26 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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