

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)**

--	--	--	--	--

--	--	--	--	--

**Tuesday 5 November 2019**

Morning (Time: 1 hour 30 minutes)

Paper Reference **1MA1/1F**

**Mathematics**

**Paper 1 (Non-Calculator)**  
**Foundation Tier**

**You must have:** Ruler graduated in centimetres and millimetres,  
protractor, pair of compasses, pen, HB pencil, eraser.  
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 not be used.**



### 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 ►

P58865A

©2019 Pearson Education Ltd.

6/1/1/

**.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 the value of the 7 in the number 1074

The 7 is in the tens place so is worth 7 tens

70

(Total for Question 1 is 1 mark)

- 2 Write 4.58 correct to 1 decimal place.

The 5 rounds up to a 6 due to the 8 in the next decimal place.  
Everything after the first decimal place is then set to 0 and ignored

4.6

(Total for Question 2 is 1 mark)

- 3 Work out  $31.7 \times 100$

Multiplying by 100 moves the decimal point twice to the right

3170

(Total for Question 3 is 1 mark)

- 4 Write the fraction  $\frac{28}{70}$  in its simplest form.

$\frac{14}{35}$

Dividing both the numerator and denominator by 2

Dividing both the numerator and denominator by 7

$\frac{2}{5}$

(Total for Question 4 is 1 mark)

- 5 Write 15% as a decimal.

To convert a percentage to decimal, divide it by 100.  
This moves the decimal point twice to the left

0.15

(Total for Question 5 is 1 mark)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

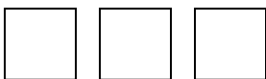


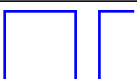
DO NOT WRITE IN THIS AREA


DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

6 The pictogram shows information about the number of pictures sold in an art shop in each of January, February and March.

January	
February	
March	
April	

**Key:**  
 represents 8 pictures

(a) Write down the number of pictures sold in January.

There are 3 whole symbols and each one represents 8 pictures.  $3 \times 8 = 24$

..... 24  
(1)

12 pictures were sold in April.

(b) Show this information on the pictogram.

$$\begin{array}{r} 01.5 \\ 8 \overline{)12.0} \end{array}$$

This works out that 1.5 symbols represents 12 pictures

(1)

(c) What was the total number of pictures sold in these four months?

$$\begin{array}{r} 10.5 \\ \times 8 \\ \hline 84.0 \end{array}$$

There are 10.5 symbols in total for these four months and each one represents 8 pictures

..... 84  
(2)

(Total for Question 6 is 4 marks)

7 Work out the difference, in minutes, between 1 hour 25 minutes and  $1\frac{1}{4}$  hours.

$$\begin{array}{r} 15 \\ 4 \overline{)60} \end{array}$$

There are 60 minutes in an hour. This works out than there are 15 minutes in  $1/4$  of an hour

The hours can be ignored as they are both the same. So just working out the difference in the minutes. Difference = largest - smallest =  $25 - 15 = 10$

..... 10 minutes

(Total for Question 7 is 2 marks)

8 Prasha has five blocks of wood.

The total weight of all five blocks of wood is 3 kilograms.  
4 of the blocks of wood each have a weight of 650 grams.

Work out the weight, in grams, of the other block of wood.

$$\begin{array}{r} 650 \\ \times 4 \\ \hline 2600 \end{array}$$

This works out that the total weight of the 4 blocks of wood is 2600 g

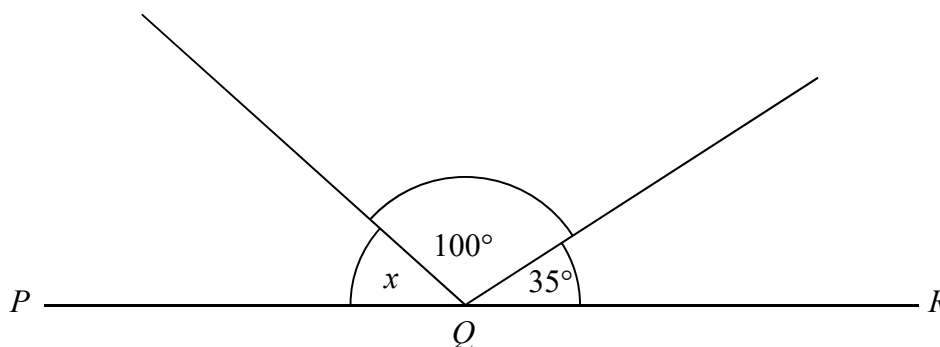
$$\begin{array}{r} 3000 \\ -2600 \\ \hline 400 \end{array}$$

Subtracting the weight of the 4 blocks from the total weight of all five leaves the weight of the other block of wood. There are 1000 g in 1 kg so 3 kg is 3000 g

..... 400 ..... grams

(Total for Question 8 is 3 marks)

9  $PQR$  is a straight line.



Work out the size of angle  $x$ .

$$\begin{array}{r} 180 \\ -100 \\ -35 \\ \hline 45 \end{array}$$

There are  $180^\circ$  in total around a point on a straight line. Subtracting the other angles leaves  $x$

..... 45 .....  $^\circ$

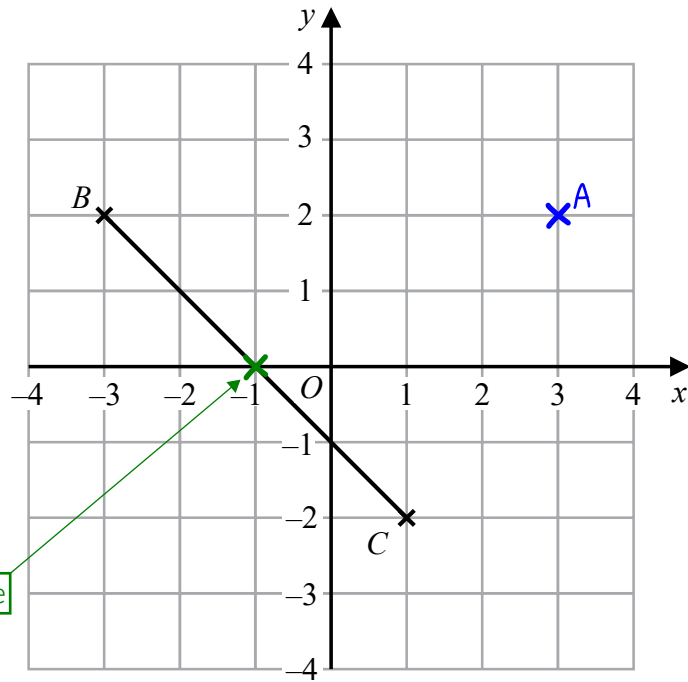
(Total for Question 9 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

10



The midpoint of BC is here

- (a) Plot the point with coordinates (3, 2)  
Label this point *A*.

(1)

- (b) Write down the coordinates of the midpoint of *BC*.

( ..... -1 ..... , ..... 0 ..... )  
(1)

(Total for Question 10 is 2 marks)

- 11 Mason throws a coin 3 times.  
The outcome of each throw is either Heads or Tails.

List all the possible outcomes of the 3 throws.

HHH, HHT, HTH, HTT, THH, THT, TTH, TTT

The outcomes are systematically listed

(Total for Question 11 is 2 marks)

12 Rehan is on holiday in the USA.

He has \$200 to spend on clothes.

Rehan buys

- 1 pair of trainers costing \$60
- 3 T-shirts costing \$25 each.

He also wants to buy a jacket costing \$80

- (a) Has Rehan got enough money to buy the jacket?  
You must show how you get your answer.

$$\begin{array}{r} 25 \\ \times 3 \\ \hline 75 \end{array}$$

← This works out that the total cost of the 3 t-shirts is \$75

$$\begin{array}{r} 200 \\ - 60 \\ - 75 \\ \hline 65 \end{array}$$

← Subtracting the cost of the trainers and 3 t-shirts from the amount of money he has leaves the amount of money he has left for the jacket

No

← \$65 is not enough to buy the jacket as \$80 is more than this

(3)

The trainers cost \$60

The exchange rate is \$1 = £0.749

Rehan says,

“The trainers cost less than £40”

Rehan is wrong.

- (b) Using a suitable approximation, show working to explain why.

$$\begin{array}{r} 60 \\ \times 0.7 \\ \hline 42.0 \end{array}$$

← Rounding the exchange rate down to \$1 = £0.70 works out that the trainers would cost £42. This is an underestimate so the trainers must cost more than £42 so cannot be less than £40

(2)

(Total for Question 12 is 5 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

13 (a) Simplify  $2a \times 5b$

The multiplication can be done in any order so the  $2 \times 5$  can be done first.  
Then the letters can be written next to the 10 to mean that they are multiplied

..... 10ab

(1)

(b) Simplify  $3x + 2y + 5x - y$

Simplified by collecting the like terms.  $3x + 5x = 8x$  and  $2y - y = y$

..... 8x+y

(2)

(Total for Question 13 is 3 marks)

14 Work out  $23 \times 15$

$$\begin{array}{r} 23 \\ \times 15 \\ \hline 115 \\ 230 \\ \hline 345 \end{array}$$

..... 345

(Total for Question 14 is 2 marks)

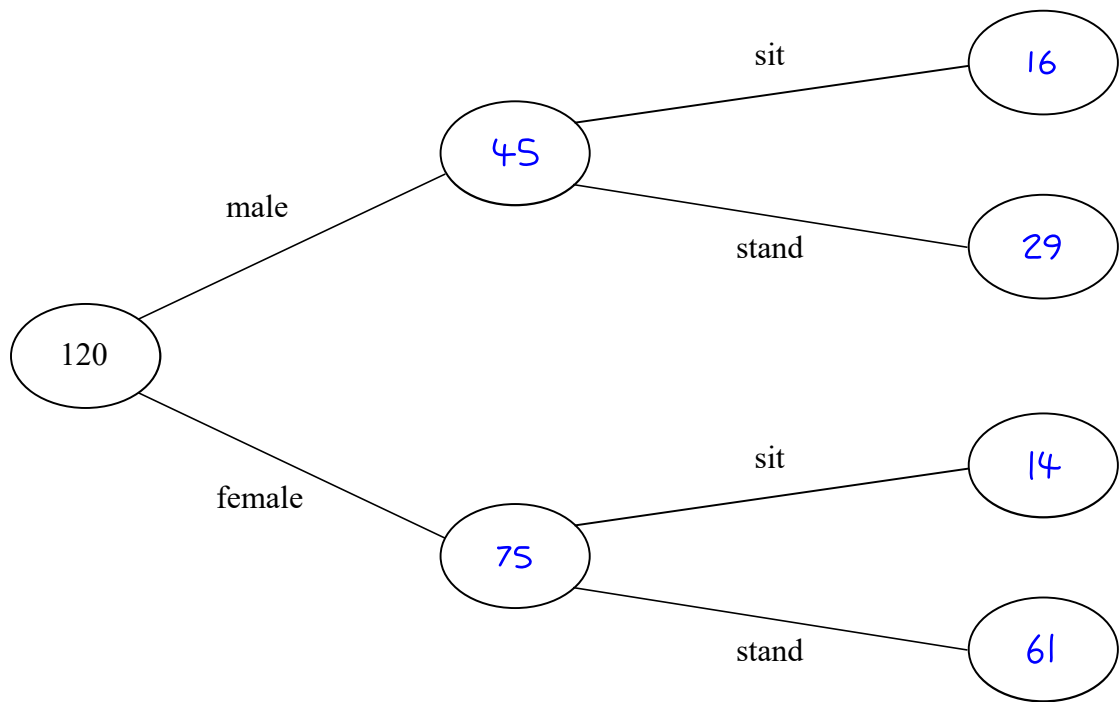
15 120 people were at a hockey match.

Each person was asked if they wanted to stand or to sit to watch the match.

75 of the people were female  
 29 of the males wanted to stand  
 30 of the people wanted to sit

$$\begin{array}{r} 120 \\ -75 \\ \hline 45 \end{array} \quad \begin{array}{r} 45 \\ -29 \\ \hline 16 \end{array} \quad \begin{array}{r} 30 \\ -16 \\ \hline 14 \end{array} \quad \begin{array}{r} 75 \\ -14 \\ \hline 61 \end{array}$$

(a) Use this information to complete the frequency tree.



(3)

One of the 120 people is chosen at random.

(b) Write down the probability that this person is a male who wanted to stand.

29 out of the 120 people were male who wanted to stand

$$\frac{29}{120}$$

(1)

(Total for Question 15 is 4 marks)

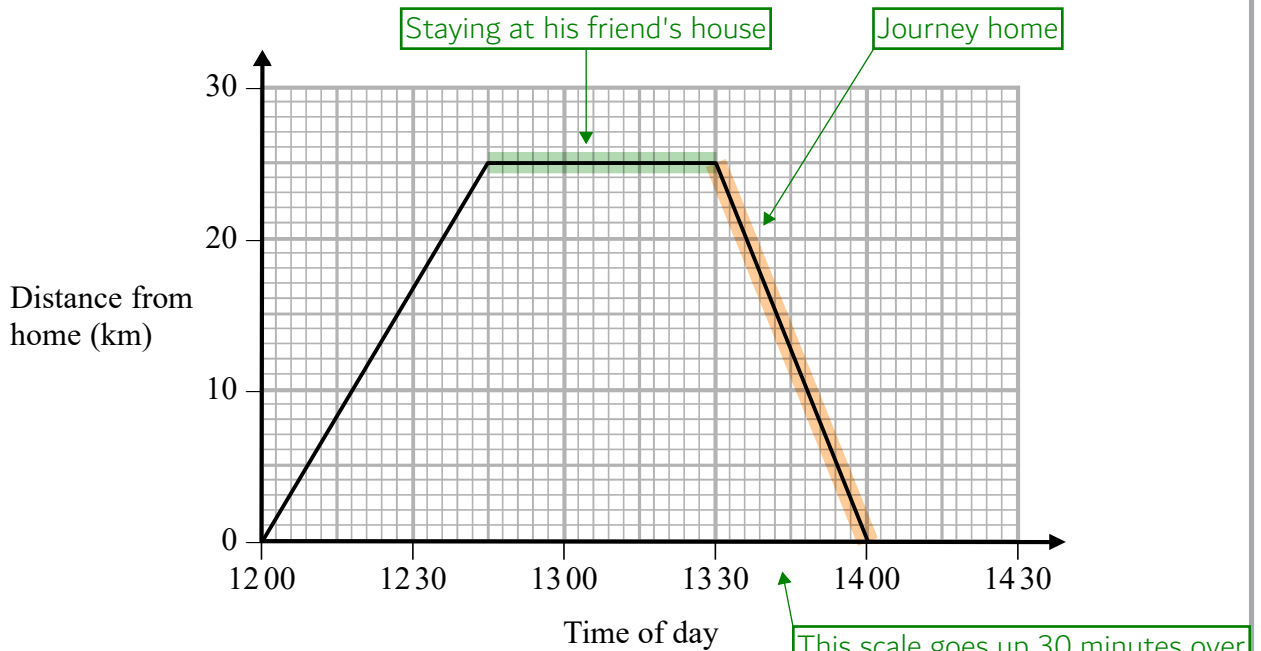
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

16 Steve drove from his home to his friend's house. He stayed at his friend's house and then drove home.

Here is Steve's travel graph.



(a) For how many minutes did Steve stay at his friend's house?

$\frac{15}{45}$  ← The distance didn't change for 15 small boxes and this must be when he stayed at his friend's house. Multiplying the 15 small boxes by the 3 minutes represented by each one works out that this is 45 minutes ..... 45 ..... minutes (1)

(b) What was Steve's average speed on his journey home?

$25 \div \frac{1}{2}$  ← The unit of km/h means to divide the number of kilometres travelled by the time taken in hours. He travelled 25 kilometres in 30 minutes. There are 60 minutes in an hour and  $30/60 = 1/2$  so this is  $1/2$  an hour

$\frac{25}{50}$  ← To divide by a fraction: keep the first number, change the division to multiplication, and flip the second fraction.  $2/1$  is 2

..... 50 ..... km/h (2)

(Total for Question 16 is 3 marks)

17  $x - 1 = 2$

Work out the value of  $2x^2$

$x = 3$  ← Adding 1 to both sides gets x on its own

$2 \times 3^2$  ← Substituting 3 for x in  $2x^2$

$3^2 = 3 \times 3 = 9$ . Then  $2 \times 9 = 18$

18

(Total for Question 17 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

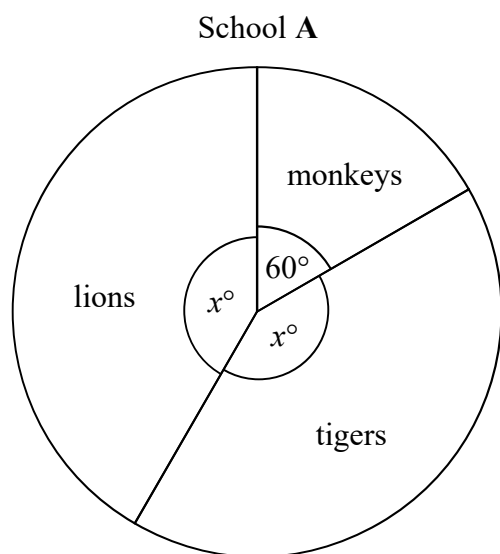
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

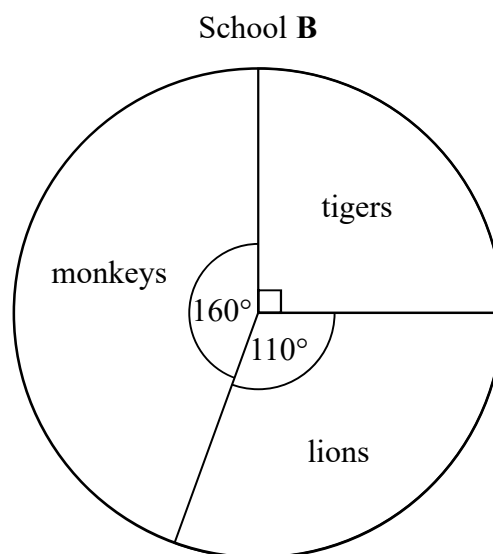
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

18 The pie charts show information about the favourite animal of each student at school A and of each student at school B.



There are 480 students at school A.



There are 760 students at school B.

Henry says,

“The same number of students at each school have tigers as their favourite animal.”

Is Henry correct?

You must show how you get your answer.

$$\frac{360-60}{2} = 150$$

There are  $360^\circ$  in total in a pie chart. Subtracting the  $60^\circ$  leaves the number of degrees for both of the  $x$  angles. These are both equal so the result can be divided by 2 to work out one of the  $x$  angles.  $360 - 60 = 300$  then  $300/2 = 150$

$$\frac{150}{360} = \frac{15}{36} = \frac{5}{12}$$

Expressing the  $150^\circ$  representing tigers in school A as a fraction of the total  $360^\circ$ . Then simplifying the fraction by dividing both the numerator and denominator by a common factor

$$\frac{040 \times 5 = 200}{12 \overline{) 480}}$$

Working out  $5/12$  of the 480 students in school A to work out that 200 have tigers as their favourite animal. To do a fraction of an amount: divide the amount by the denominator then multiply the result by the numerator

$$\frac{90}{360} = \frac{9}{36} = \frac{1}{4}$$

Expressing the  $90^\circ$  representing tigers in school B as a fraction of the total  $360^\circ$ . Then simplifying the fraction by dividing both the numerator and denominator by a common factor

$$\frac{190}{4 \overline{) 760}}$$

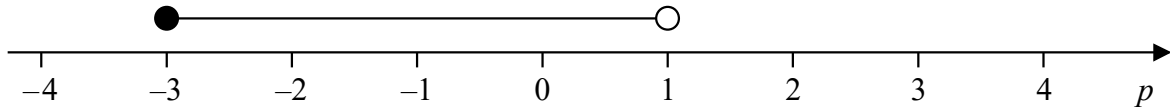
Working out  $1/4$  of the 760 students in school B to work out that 190 have tigers as their favourite animal

No

The 200 who have tigers as their favourite animal in school A is not the same as the 190 who have tigers as their favourite animal in school B

(Total for Question 18 is 4 marks)

19 Here is a number line.



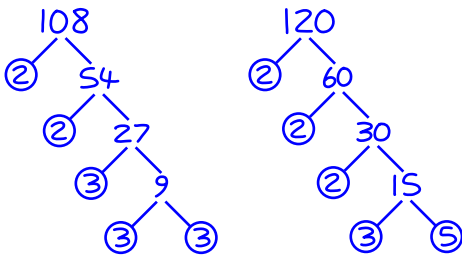
Write down the inequality shown on the number line.

The line goes to the right of -3 so  $p$  is greater than -3.  $p$  can also be equal to -3 as the dot is closed. The line goes to the left of 1 so  $p$  is less than 1.  $p$  cannot be equal to 1 as the dot is open

$$-3 \leq p < 1$$

(Total for Question 19 is 2 marks)

20 Find the Lowest Common Multiple (LCM) of 108 and 120



Doing factor trees for both 108 and 120 to express them as product of prime factors. So  $108 = 2^2 \times 3^3$  and  $120 = 2^3 \times 3 \times 5$

$$2^3 \times 3^3 \times 5$$

The Lowest Common Multiple is the highest power of each prime in both product of prime factors multiplied together

$$\begin{array}{r} 27 \\ \times 8 \\ \hline 216 \\ \times 5 \\ \hline 1080 \end{array}$$

$2^3 = 2 \times 2 \times 2 = 8$ .  $3^3 = 3 \times 3 \times 3 = 27$ . Multiplying these together then multiplying by the 5

$$1080$$

(Total for Question 20 is 3 marks)

- 21 There are 60 people in a choir.  
Half of the people in the choir are women.

The number of women in the choir is 3 times the number of men in the choir.  
The rest of the people in the choir are children.

the number of children in the choir : the number of men in the choir =  $n : 1$

Work out the value of  $n$ .

You must show how you get your answer.

$W = 60 \div 2 = 30$  ← Half of the 60 people in the choir are women. So there are 30 women

$M = 30 \div 3 = 10$  ← The number of women in the choir is 3 times the number of men in the choir. So there are 10 men

$C = 60 - 30 - 10 = 20$  ← Subtracting the 30 women and 10 men from the 60 people works out that there are 20 children

$20 : 10$  ← Expressing the ratio of the number of children in the choir : the number of men in the choir

$2 : 1$  ← Simplifying the ratio by dividing both sides by 10 gets 1 on the right

$n = \dots\dots\dots 2 \dots\dots\dots$

(Total for Question 21 is 4 marks)

- 22 Work out  $1\frac{3}{4} \times 1\frac{1}{3}$

Give your answer as a mixed number.

$\frac{7}{4} \times \frac{4}{3}$  ← Converting the mixed numbers into improper fractions by multiplying the whole numbers by the denominators then adding the results to the numerators. This makes it easier to multiply

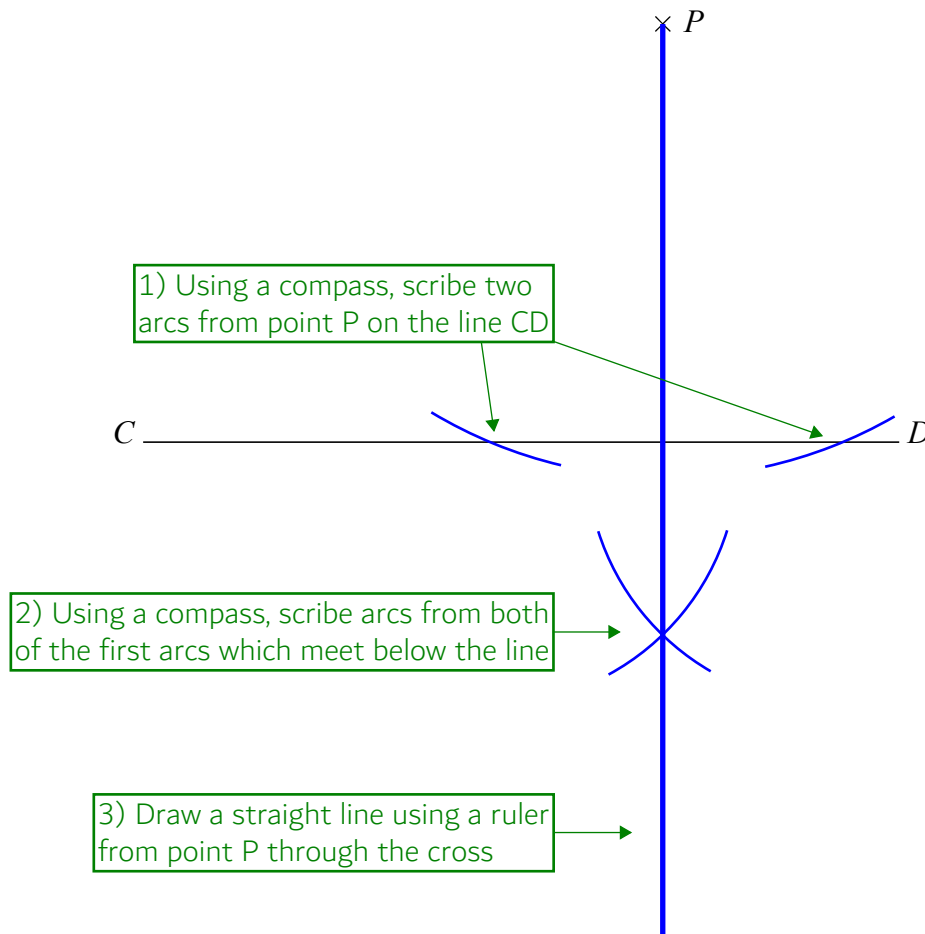
$\frac{28}{12}$  ← Multiplying the fractions by multiplying the numerators and multiplying the denominators

Converted into a mixed number by considering that 12 goes into 28 2 times with a remainder of 4. The 2 is the whole number and the remainder of 4 is left in the fraction

$2\frac{4}{12}$

(Total for Question 22 is 3 marks)

- 23 Use a ruler and compasses to construct the line from the point  $P$  perpendicular to the line  $CD$ . You must show **all** construction lines.



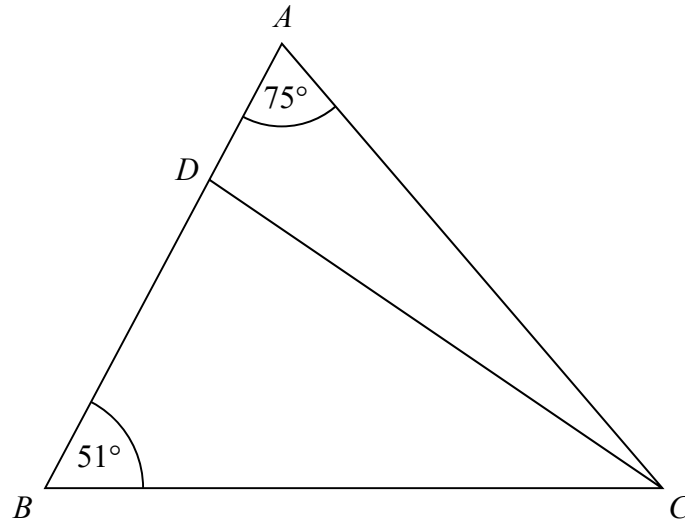
(Total for Question 23 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

24 The diagram shows triangle  $ABC$ .



$ADB$  is a straight line.

the size of angle  $DCB$  : the size of angle  $ACD = 2 : 1$

Work out the size of angle  $BDC$ .

$$\begin{array}{r} 180 \\ - 75 \\ - 51 \\ \hline 54 \end{array}$$

Angles in a triangle add up to  $180^\circ$ . So subtracting the other angles in triangle  $ABC$  from  $180^\circ$  works out that angle  $ACB$  is  $54^\circ$

$$\begin{array}{r} 18 \\ 3 \overline{) 54} \\ \underline{36} \\ 18 \end{array}$$

Angle  $ACB$  is the total of angles  $DCB$  and  $ACD$ . This is represented by 3 parts in the ratio as  $2 + 1 = 3$  so dividing angle  $ACB$  by 3 works out that the value of 1 part of the ratio is worth  $18^\circ$

$$\begin{array}{r} 18 \\ \times 2 \\ \hline 36 \end{array}$$

Angle  $DCB$  is worth 2 parts in the ratio so multiplying the value of 1 part of the ratio by 2 works out that angle  $DCB$  is  $36^\circ$

$$\begin{array}{r} 180 \\ - 36 \\ - 51 \\ \hline 93 \end{array}$$

Angles in a triangle add up to  $180^\circ$ . So subtracting the other angles in triangle  $DBC$  from  $180^\circ$  works out that angle  $BDC$  is  $93^\circ$

..... 93 °

(Total for Question 24 is 4 marks)

- 25 4 red bricks have a mean weight of 5 kg.  
 5 blue bricks have a mean weight of 9 kg.  
 1 green brick has a weight of 6 kg.

Donna says,

“The mean weight of the 10 bricks is less than 7 kg.”

Is Donna correct?

You must show how you get your answer.

$m \div n$

Mean = total  $\div$  number, where total is the total weight and number is the number of bricks. Writing this as a formula triangle

$4 \times 5$   
 $5 \times 9$

Covering t in the formula triangle finds that total = mean  $\times$  number. This works out that the total weight of the red bricks is 20 kg and that the total weight of the blue bricks is 45 kg

$\begin{array}{r} 20 \\ +45 \\ +6 \\ \hline 71 \end{array} \div 10 = 7.1$

Adding together the total weight of the red bricks, the blue bricks and the green brick works out that the total weight of all of the bricks is 71 kg.  
 Dividing this by 10 works out that the mean weight of the 10 bricks is 7.1 kg

No

The mean is 7.1 kg, which is not less than 7 kg

(Total for Question 25 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

26 (a) Simplify  $(p^2)^5$

$$(a^x)^y = a^{xy}, \text{ so multiplying the 2 and 5}$$

$$p^{10}$$

(1)

(b) Simplify  $12x^7y^3 \div 6x^3y$

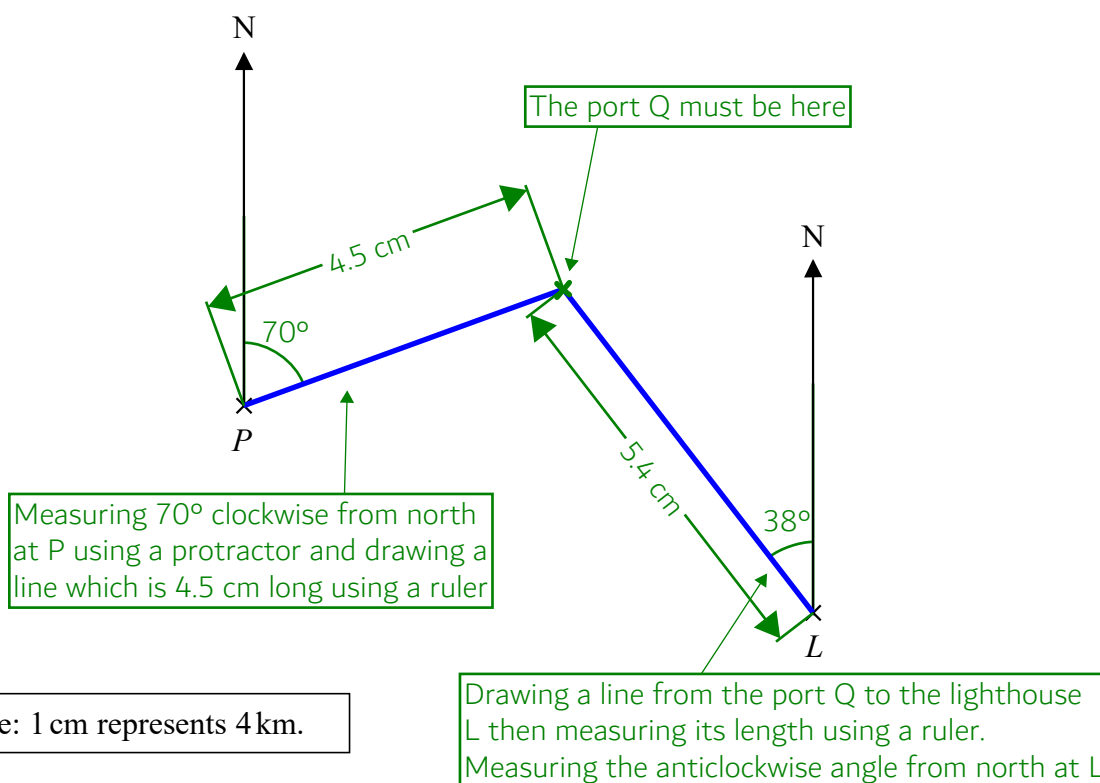
$$12 \div 6 = 2. x^7 \div x^3 = x^4. y^3 \div y = y^2$$

$$2x^4y^2$$

(2)

(Total for Question 26 is 3 marks)

27 The accurate scale drawing shows the positions of port  $P$  and a lighthouse  $L$ .



Aleena sails her boat from port  $P$  on a bearing of  $070^\circ$

She sails for  $1\frac{1}{2}$  hours at an average speed of 12 km/h to a port  $Q$ .

Find

- the distance, in km, of port  $Q$  from lighthouse  $L$ ,
- the bearing of port  $Q$  from lighthouse  $L$ .

$s^d_t$

Writing a formula triangle for distance, speed and time

$12 \times 1\frac{1}{2}$

Covering  $d$  in the formula triangle finds that distance = speed  $\times$  time. Working out the distance she sailed to port  $Q$ .  $1 \times 12 = 12$ .  $1/2 \times 12 = 6$ .  $12 + 6 = 18$

$\frac{04.5}{4 \overline{)18.0}}$

Every 4 km is represented by 1 cm so dividing the distance by 4 works out how many centimetres represent it

$\begin{array}{r} 5.4 \\ \times 4 \\ \hline 21.6 \end{array}$

Every 1 cm represents 4 km so multiplying the measured distance by 4 works out the actual distance in kilometres

$\begin{array}{r} 360 \\ - 38 \\ \hline 322 \end{array}$

Subtracting the anticlockwise angle from north at  $L$  from  $360^\circ$  works out the bearing

distance  $QL = \dots\dots\dots 21.6 \dots\dots\dots$  km

bearing of  $Q$  from  $L = \dots\dots\dots 322 \dots\dots\dots^\circ$

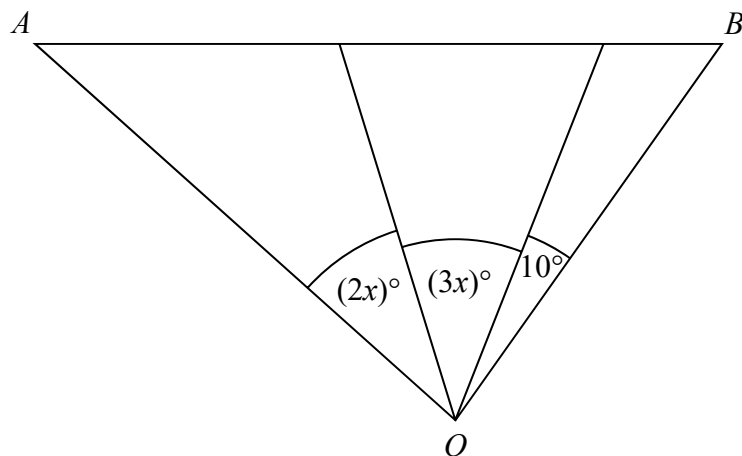
(Total for Question 27 is 5 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

28 The diagram shows triangle  $AOB$ .



Angle  $AOB$  is **not** an obtuse angle.

Find the greatest value of  $x$ .

You must show all your working.

$$2x + 3x + 10 = 90$$

$x$  is greatest when angle  $AOB$  is greatest. Obtuse angles are more than  $90^\circ$  but less than  $180^\circ$ . As it is not obtuse, the greatest angle  $AOB$  can be is  $90^\circ$  as the angle cannot possibly be  $180^\circ$  or more as there are only  $180^\circ$  in a triangle. Adding all of the angles together and setting it equal to the  $90^\circ$  creates an equation in terms of  $x$  which can be solved

$$5x = 80$$

Simplifying by collecting like terms.  $2x + 3x = 5x$ . Then subtracting 10 from both sides gets the  $x$  term on its own

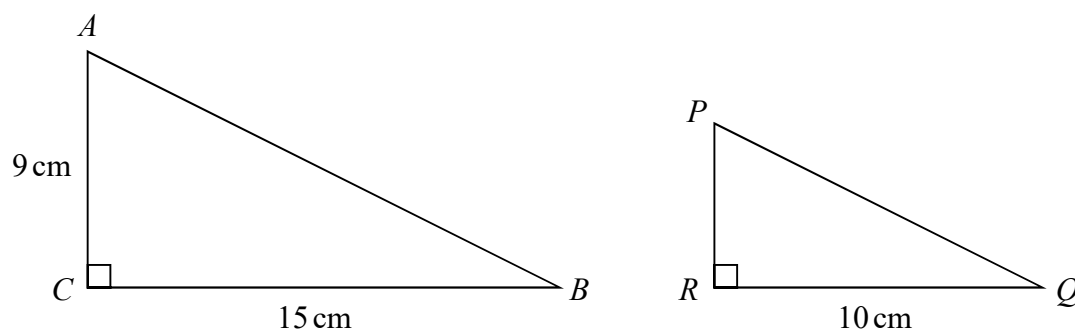
$$5 \overline{) 80} \\ \underline{50} \\ 30$$

Dividing both sides by 5 works out  $x$

..... 16

(Total for Question 28 is 3 marks)

29  $ABC$  and  $PQR$  are similar right-angled triangles.



angle  $ABC =$  angle  $PQR$

(a) Work out the length of  $PR$ .

$$\frac{10}{15}$$

Expressing the 10 cm length of the smaller triangle as a fraction of the the 15 cm length of the larger triangle

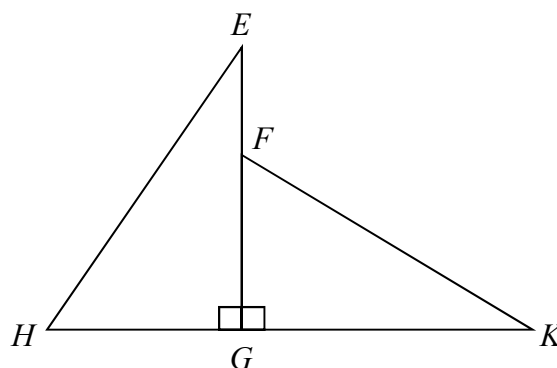
$$\frac{2}{3} \times 9$$

Simplifying the fraction and doing that fraction of the side  $AC$ , which is the larger version of  $PR$

To do a fraction of an amount: divide the amount by the denominator then multiply the result by the numerator.  $9 \div 3 = 3$  then  $3 \times 2 = 6$

$$6 \dots\dots\dots \text{cm} \quad (2)$$

Triangle  $EGH$  is congruent to triangle  $KGF$ .



$HK = 10$  cm.

$HG = 4$  cm.

(b) Work out the length of  $EF$ .

$$10 - 4$$

Subtracting  $HG$  from  $HK$  works out that  $GK$  is 6 cm.  $GE$  must also be 6 cm as the triangles are congruent (the same shape and size)

$$6 - 4$$

Subtracting  $FG$  (which is 4 cm as it is the same as  $HG$ ) from  $GE$  works out that  $EF$  is 2 cm

$$\dots\dots\dots 2 \dots\dots\dots \text{cm} \quad (2)$$

(Total for Question 29 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS