Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Thursday 6 June 2019

Morning (Time: 2 hours) | Paper Reference **4MA1/2F**

Mathematics A

Level 1/2

Paper 2F

Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- 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.
- Check your answers if you have time at the end.

Turn over ▶

P58368A

1/1/1/

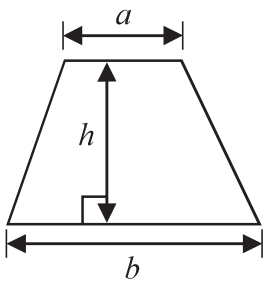
P 5 8 3 6 8 A 0 1 2 4

Pearson

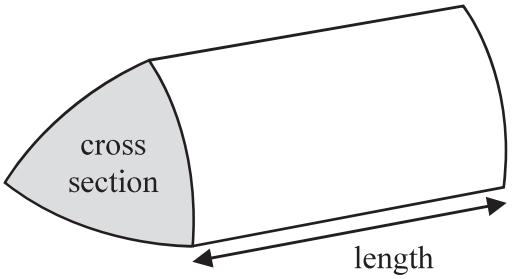
International GCSE Mathematics

Formulae sheet – Foundation Tier

Area of trapezium = $\frac{1}{2}(a + b)h$

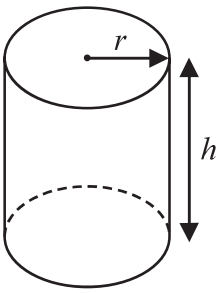


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY TWO questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write these numbers in order.
Start with the smallest number.

3 −8 1 −5 0

negative values first

-8, -5, 0, 1, 3

(1)

(b) Write these numbers in order of size.
Start with the smallest number.

(3) 2.5 (5) 2.85 (1) 2.082 (2) 2.28 (4) 2.805

2·082, 2·28, 2·5, 2·805, 2·85

(1)

(c) Find

(i) the value of $\sqrt{196}$

type into calculator
or 14 × 14 = 196

14

(ii) the cube root of 6859

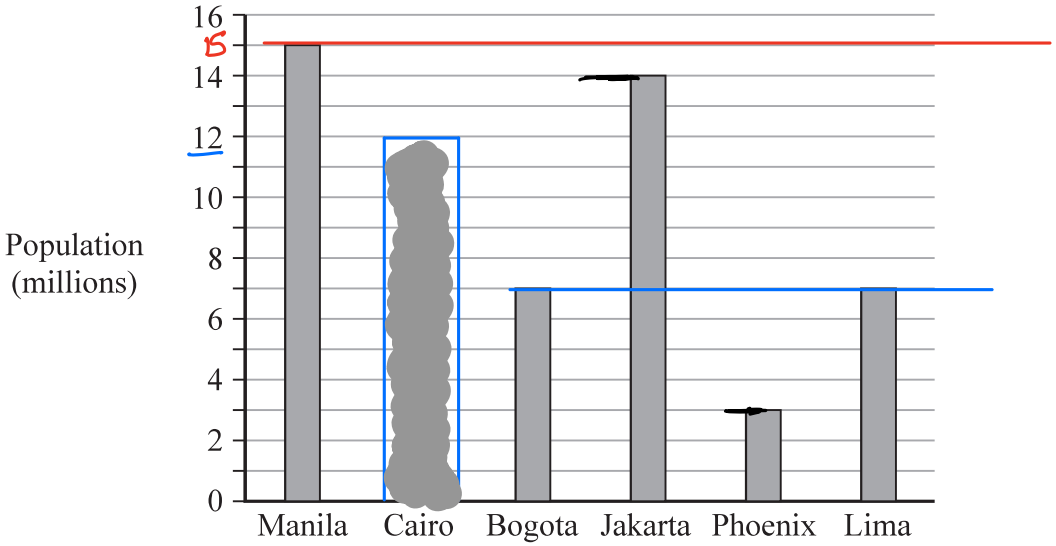
type $\sqrt[3]{6859}$ into calculator

19

(2)

(Total for Question 1 is 4 marks)

2 The bar chart gives information about the population, in millions, of each of five cities.



Cairo has a population of 12 million.

(a) Draw a bar on the bar chart to show this information.

(1)

The populations of two cities are equal.

(b) Write down the names of these two cities.

Bogota and Lima

(1)

(c) Write down the name of the city with a population of 15 million.

Manila

(1)

(d) Work out the difference in population between Jakarta and Phoenix.

Jakarta : 14

Phoenix : 3

14 - 3 = 11

11 million

(1)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

In Manila, there are 90 badminton clubs and 60 football clubs.

(e) Find the ratio of the number of badminton clubs to the number of football clubs.
Give your ratio in its simplest form.

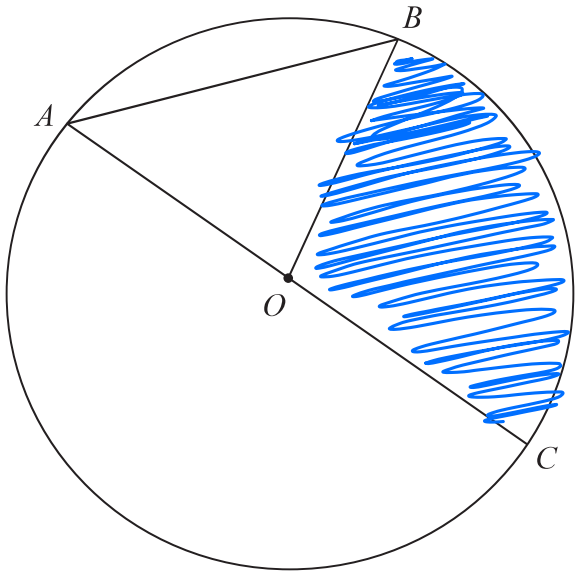
90 : 60
÷30 ÷30
3 : 2

3 : 2

(2)

(Total for Question 2 is 6 marks)

3 *A*, *B* and *C* are points on a circle, centre *O*.
AOC is a straight line.



(a) Write down the mathematical name for the line *AC*.

AC – line connecting to points on circumference going through origin

Diameter

(1)

(b) Write down the mathematical name for the line *AB*.

AB – line connecting to points on circumference not going through origin

Chord

(1)

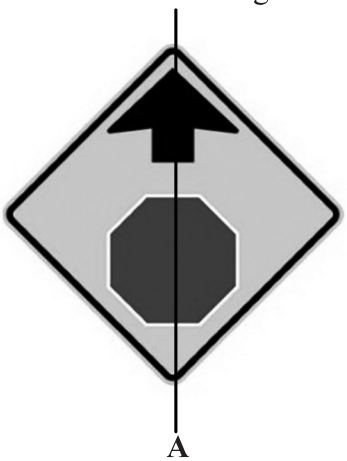
(c) On the diagram, shade a sector of the circle.

pie shaped

(1)

(Total for Question 3 is 3 marks)

4 Here are five road signs.



A

B

C

D

E

One of these five road signs has one line of symmetry.

(a) Write down the letter of this road sign.

A

(1)

One of these five road signs has an order of rotational symmetry greater than 1

(b) (i) Write down the letter of this road sign.

When Rotating D it is the same shape.

D

(ii) Write down the order of rotational symmetry of this road sign.

3

(2)

Road sign **E** is in the shape of a polygon with 8 sides.

(c) Write down the name of a polygon with 8 sides.

Octagon

(1)

(Total for Question 4 is 4 marks)

5 (a) Which one of these fractions is equivalent to $\frac{4}{5}$?

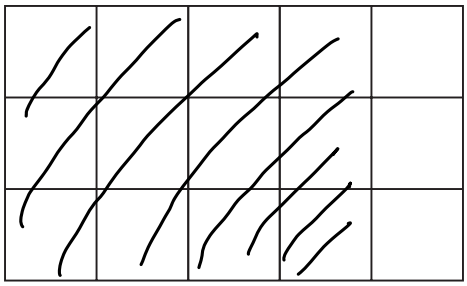
$\frac{20}{24} \div 4$ $\frac{8}{12} \div 4$ $\frac{1}{2}$ $\frac{16}{20} \div 4$ $\frac{6}{10} \div 2 \div 3$

$= \frac{5}{6} \quad \frac{2}{3} \quad \frac{1}{2} \quad \frac{4}{5} \quad \frac{3}{5}$

$\frac{16}{20}$

(1)

Here is a shape made of squares.



(b) Shade $\frac{4}{5}$ of the shape.

15 squares $\frac{4}{5}$ of 15 = 12

(1)

(c) Write $\frac{4}{5}$ as a percentage.

$(4 \div 5) \times 100$

$= 0.8 \times 100$

80 %

(1)

$\frac{4}{5}$ of a number is 48

(d) What is the number?

Lets call the number x

$\frac{4}{5} x = 48$ $\times 5$

$4x = 240$ $\div 4$

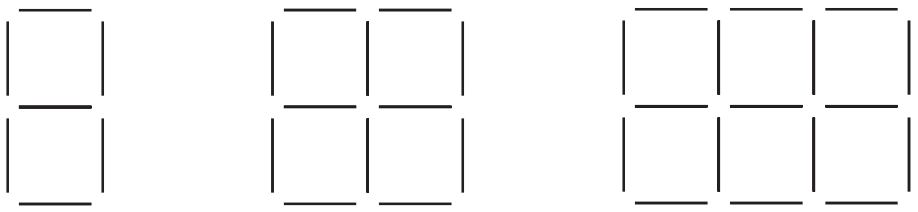
$x = 60$

60

(2)

(Total for Question 5 is 5 marks)

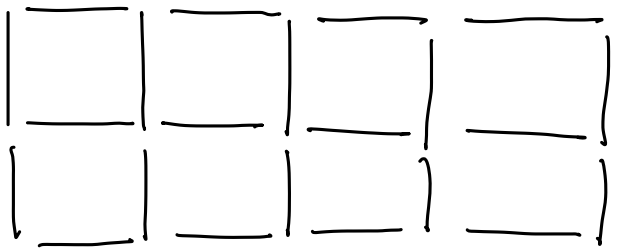
6 Here is a sequence of patterns made from sticks.



Pattern number 1 | Pattern number 2 | Pattern number 3

(a) In the space below, draw Pattern number 4

two squares are added each time



these are the two new squares for pattern 4

(1)

(b) How many sticks are needed to make Pattern number 7?

Pattern 1 : 7 (+5)
Pattern 2 : 12 (+5)
Pattern 3 : 17 (+5)
Pattern 4 : 22 (+5)
5 : 27 (+5)
6 : 32 (+5)
7 : 37

37

(2)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(c) Work out the Pattern number of the pattern made from exactly 62 sticks.

Nth term:

Difference = 5

N x n

0 zeroth term +2

5n+2

7 - 5 = 2

5n + 2 = 62

−2

5n = 60

÷5

n = 12

12

(2)

Pedro says,

"There will be a pattern in the sequence with exactly 123 sticks."

(d) Is Pedro correct?
You must give a reason for your answer.

5n + 2 = 123

5n = 121

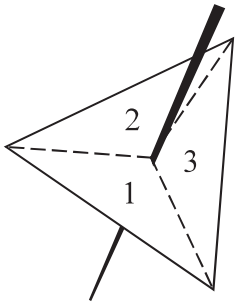
n = 24.2

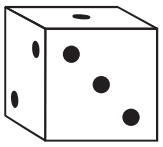
No, 123 is not in the sequence as n is not a whole number. Therefore, there will not be a pattern with only 123 sticks

(1)

(Total for Question 6 is 6 marks)

7 In a game, a fair 3-sided spinner is spun once and a fair dice is rolled once.





The spinner can land on 1, 2 or 3
The dice can land on 1, 2, 3, 4, 5 or 6

In the game, the score is found by multiplying the number the spinner lands on by the number the dice lands on.

(a) Complete the table to show all possible scores.
Eleven of the scores have been done for you.

		Dice					
		1	**2**	**3**	**4**	**5**	**6**
Spinner	**1**	1	2	3	4	5 (5×1)	6 (6×1)
	2	2 (1×2)	4	6 (3×2)	8	10	12 (6×2)
	3	3	6	9 (3×3)	12	15 (5×3)	18

(2)

Steven plays the game once.

(b) Work out the probability that his score is greater than 10

18 is the total possible scores

4 scores are greater than 10

$P = \frac{4}{18} = \frac{2}{9}$

$\frac{2}{9}$

(2)

Adam plays the game and Carmen plays the game.

Adam gets a prize if his score is 5 or less. – 8 possible scores
Carmen gets a prize if her score is a multiple of 6 - 6 possible scores

Carmen says the game is unfair because Adam is more likely to get a prize.

(c) Is the game unfair?
You must give a reason for your answer.

Yes, the probability of Adam winning is $\frac{8}{18}$, the probability of Carmen winning is $\frac{6}{18}$. $\frac{8}{18} > \frac{6}{18}$, therefore Adam is more likely to win.

(2)

(Total for Question 7 is 6 marks)

8 Nina buys 8 pencils and 13 identical rulers.
Each pencil costs \$0.58
The total cost is \$23.62

(a) Work out the cost of each ruler.

8 pencils + 13 rulers = \$23.62

8 × 0.58 + 13 ruler price = \$23.62

4.64 + 13 ruler price = 23.62

13 ruler price = 18.98 (− 4.64)

ruler price = \$ 1.46 (÷ 13)

(3)

Bjorn has \$15 to spend on pens.
Each pen costs \$0.62
He buys as many pens as he can.

(b) Work out how much change Bjorn should get.

15 ÷ 0.62 = 24.19...

Bjorn can buy 24 pens.

This costs: 24 × 0.62 = 14.88

Change: 15 − 14.88 = 0.12

\$ 0.12

(3)

(Total for Question 8 is 6 marks)

9 Simon has x sweets.
Yuen has 2 more sweets than Simon. $= x+2$
Giulia has 3 times as many sweets as Yuen. $= 3(x+2) = 3x+6$

Simon, Yuen and Giulia have a total of T sweets.

(a) Write down a formula for T in terms of x.
Give your formula in its simplest form.

Simon + Yuen + Giulia = T
$x + x+2 + 3x+6 = T$
$5x + 8 = T$

$T = 5x+8$

(3)

(b) Make g the subject of the formula $r = 4g + 7$

isolate g

$r = 4g + 7$
-7
$r - 7 = 4g$
$\div 4$
$\frac{r-7}{4} = g$

$g = \frac{r-7}{4}$

(2)

(c) Solve $6y - 3 = 2y + 8$
Show clear algebraic working.

$6y - 3 = 2y + 8$
$-2y$ $-2y$
$4y - 3 = 8$
$+3$ $+3$
$4y = 11$
$\div 4$ $\div 4$
$y = \frac{11}{4}$

$y = 11/4$

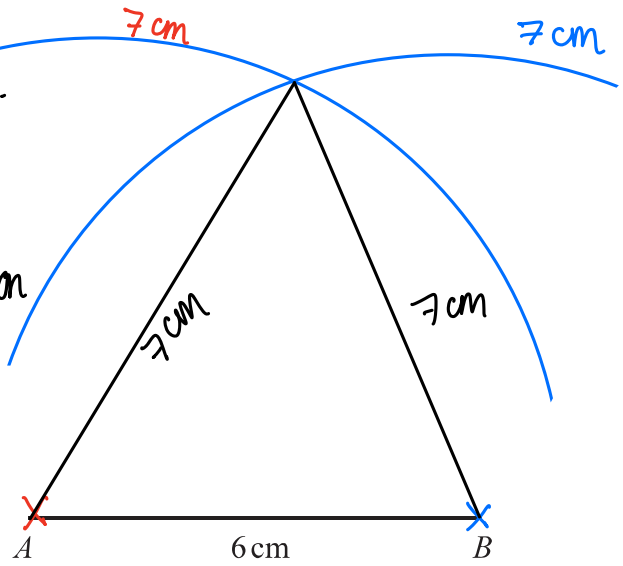
(3)

(Total for Question 9 is 8 marks)

10 ABC is an isosceles triangle.
$AB = 6\,\text{cm}$.
$AC = BC = 7\,\text{cm}$.

(a) Use ruler and compasses to construct triangle ABC.
You must show all your construction lines.
The line AB has been drawn for you.

1. Draw a circle centre A - 7 cm.
2. Do the same centre B.
3. Mark the intersection
4. Construct the triangle

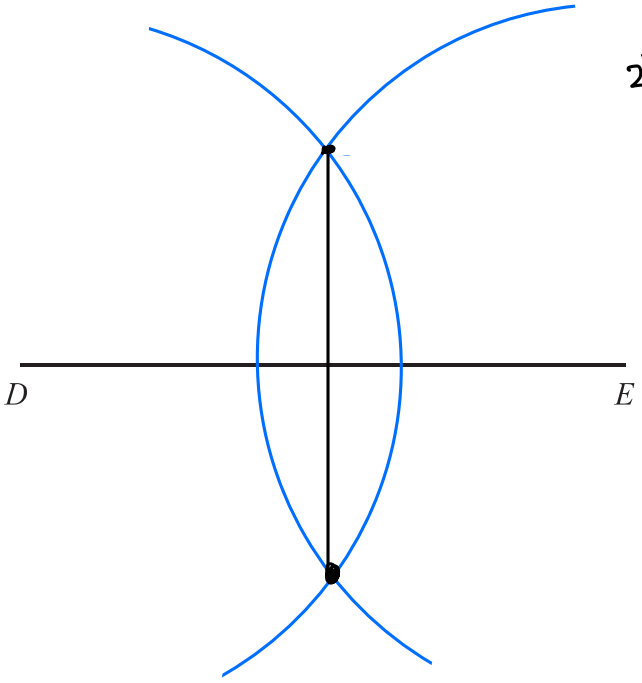


Not to scale

(2)

(b) Use ruler and compasses to construct the perpendicular bisector of the line DE.
You must show all your construction lines.

1) Draw a circle arc from D
2) Draw a circle with the same radius from E
3) Mark intersections and join



(2)

(Total for Question 10 is 4 marks)

11 Calvin and Jenny are planning a holiday together.

The total cost of the flights is £1190

Calvin and Jenny share the cost of the flights so that

the money that Calvin pays : the money that Jenny pays = 2 : 5

(a) How much more money does Jenny pay than Calvin?

C : J	Total
2 : 5	7
340 : 850	1190

× 170 ÷ 170

Jenny : 850

Calvin : − 340

510

£ 510

(3)

The cost of the villa for their holiday is £3500

They have to pay a deposit of 12% of this cost.
The rest of the cost of the villa is to be paid in monthly instalments of £220

(b) How many monthly instalments must be paid?

100% − 12% = 88% = × 0·88 — percentage of total cost is paid monthly

3500 × 0·88 = £3080 — monthly installments total

3080 ÷ 220 = 14

how many months

14

(3)

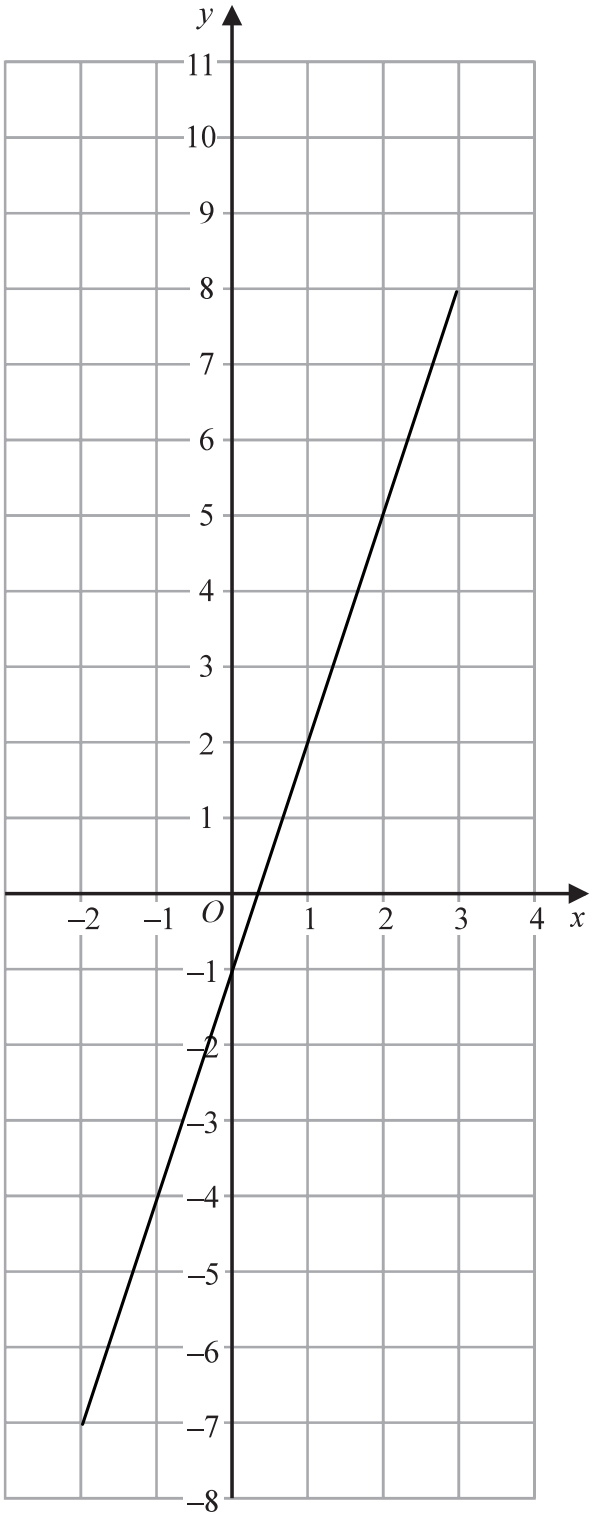
(Total for Question 11 is 6 marks)

12 On the grid, draw the graph of $y = 3x - 1$ for values of x from -2 to 3

$x = -2$: $y = 3(-2) - 1 = -6 - 1 = -7$

$x = 3$: $y = 3(3) - 1 = 9 - 1 = 8$

$(-2, -7)$ $(3, 8)$



(Total for Question 12 is 3 marks)

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

13 The table shows information about the heights, in cm, of 48 sunflowers in a garden centre.

Height of sunflower (h cm)	Frequency	x (midpoint)	fx
$90 < h \leqslant 100$	8	95	760
$100 < h \leqslant 110$	12	105	1260
$110 < h \leqslant 120$	15	115	1725
$120 < h \leqslant 130$	10	125	1250
$130 < h \leqslant 140$	3	135	405
	48		

Work out an estimate for the mean height of the sunflowers.

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f} = \frac{760+1260+1725+1250+405}{48}$$

$$= \frac{5400}{48} = 112.5$$

112.5 cm

(Total for Question 13 is 4 marks)

14 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{2, 3, 5, 7\}$
$B = \{4, 6, 8, 10\}$

(a) Explain why $A \cap B = \varnothing$

A and B

$\varnothing$ = Empty Set

Because there are no numbers that are present in Set A and Set B.

(1)

$x \in \mathscr{E}$ and $x \notin A \cup B$

x is not a subset of A or B

Not listed in A or B

(b) Write down the **two** possible values of x.

x can't be: 2, 3, 5, 7, 4, 6, 8, 10

But can be 1 or 9

1 , 9

(1)

Set C is such that

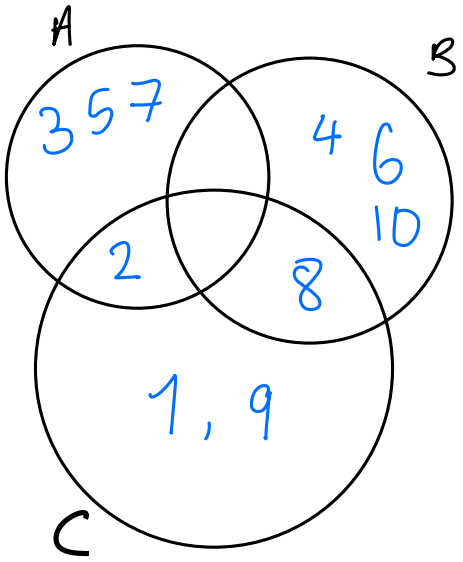
$A \cup B \cup C = \mathscr{E}$
$A \cap C = \{2\}$
$B \cap C' = \{4, 6, 10\}$

1 and 9 are in C

2 is in A and C

is not in C

(c) List all the members of set C.



1, 2, 8, 9

(2)

(Total for Question 14 is 4 marks)

15 A cylinder has diameter 14 cm and height 20 cm.

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

Volume = $\pi r^2 \times h$

radius = $14 \div 2 = 7$cm

Volume = $\pi \times 7^2 \times 20$

$= 980\pi$

$= 3078.76\ldots$

$= 3080$ (3sf) (round up)

3080 ..... cm^3

(Total for Question 15 is 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

16 Josh buys and sells books for a living.

He buys 120 books for £4 each.

He sells $\frac{1}{2}$ of the books for £5 each.

He sells 40% of the books for £7 each.
He sells the rest of the books for £8 each.

(a) Calculate Josh's percentage profit.

Josh's cost : $120 \times 4 = £480$

sells $\frac{1}{2} \times 120$ for £5 : $60 \times 5 = £300$

sells 40% of 120 for £7 : $48 \times 7 = £336$

sells $120 - 60 - 48$ for £8 : $12 \times 8 = £96$

Josh's Revenue : $300 + 336 + 96 = £732$

Profit : $\frac{\text{difference } 732 - 480}{\text{original } 480} \times 100$ ← percentage

$= \frac{252}{480} \times 100$

52.5 %

(5)

One book that Josh owns had a value of £15 on the 1st May 2019
The value of this book had increased by 20% in the last year.

(b) Find the value of the book on the 1st May 2018

Increase : $100\% + 20\% = 120\%$

In 2019 : $120\% = £15$

$\div 12$ → $10\% = £1.25$

$\times 10$ → $100\% = £12.50$

£ 12.50

(3)

(Total for Question 16 is 8 marks)

17 *ABC* and *DEF* are similar triangles.

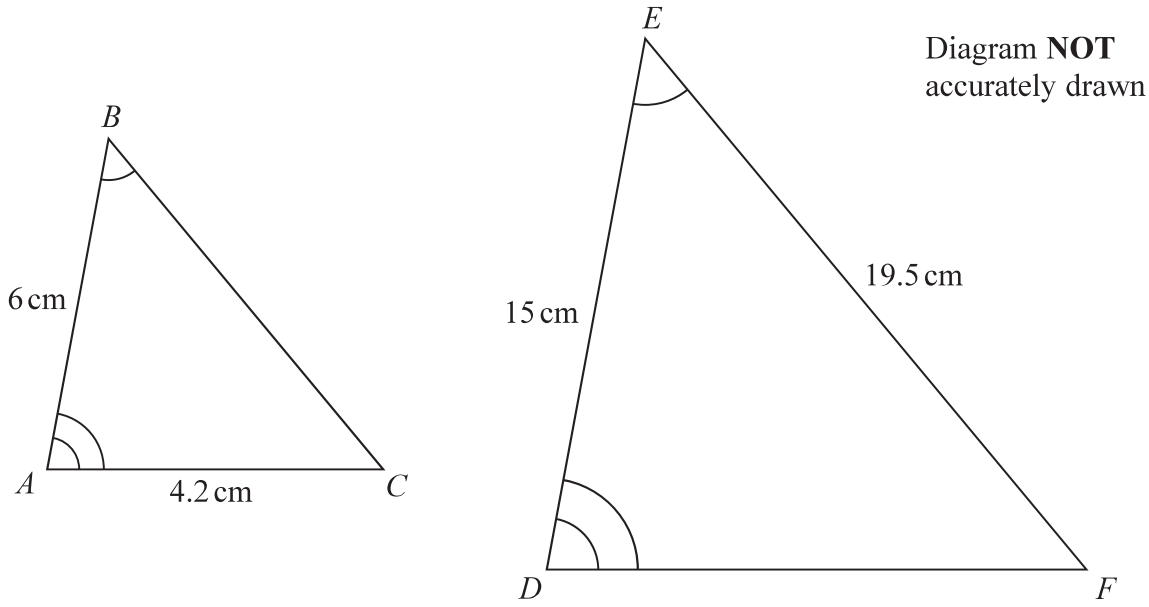


Diagram **NOT** accurately drawn

(a) Work out the length of *DF*.

scale factor : $15 \div 6 = 2.5$

$DF : AC \times 2.5$

$= 10.5$

10.5 cm

(2)

(b) Work out the length of *BC*.

scale factor : 2.5

$BC = EF \div 2.5$

$= 19.5 \div 2.5$

$= 7.8$

7.8 cm

(2)

(Total for Question 17 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

18 30 students in a class sat a Mathematics test.
The mean mark in the test for the 30 students was 26.8

13 of the 30 students in the class are boys.
The mean mark in the test for the boys was 25

Find the mean mark in the test for the girls.
Give your answer correct to 3 significant figures.

Mean = Total / Frequency

For all students: $26.8 = \frac{\text{Total}}{30}$ Total = 804

For boys: $25 = \frac{\text{Total}}{13}$ Total: 325

For girls: Total = 804 − 325 = 479

30 − 13 = 17

Mean = $\frac{479}{17} = 28.17\ldots$ = 28.2 (round up)

(Total for Question 18 is 3 marks)

19 Change a speed of x kilometres per hour into a speed in metres per second.
Simplify your answer.

60 minutes in 1 hour
60 × 60

$\frac{x \text{ km}}{1 \text{ h}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ h}}{36 \text{ ec}}$

$= \frac{1000x}{3600} = \frac{5}{18}x$

$\frac{5}{18}x$ m/s

(Total for Question 19 is 3 marks)

20 Solve the simultaneous equations

① $x + 2y = -0.5$

② $3x - y = 16$ ×2

Show clear algebraic working.

① $x + 2y = -0.5$

② ×2 $6x - 2y = 32$ + add to cancel the y term

$7x = 31.5$ ÷7

$x = 4.5$

Substitute into ②

$3 \times 4.5 - y = 16$ −16 +y

$13.5 - 16 = y$

$y = -2.5$

$x =$ 4.5

$y =$ -2.5

(Total for Question 20 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

21 The diagram shows the positions of three ships A, B and C.

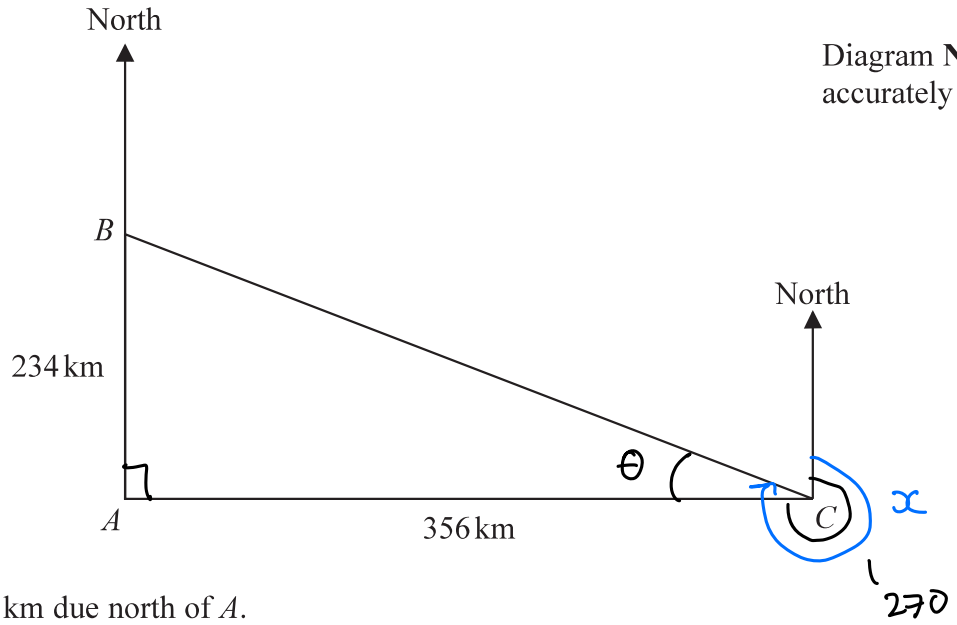


Diagram **NOT** accurately drawn

B is 234 km due north of A.
C is 356 km due east of A.

Work out the bearing of B from C.
Give your answer correct to the nearest degree.

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

$\tan\theta = \frac{234}{356}$

$\theta = \tan^{-1}\left(\frac{234}{356}\right)$

$= 33.317...°$

Bearing $= 270 + 33.317...$

$= 303.3...° = 303$ (3sf)

round down

303 °

(Total for Question 21 is 4 marks)

22 The straight line **L** has gradient 5 and passes through the point with coordinates (0, −3)

(a) Write down an equation for **L**.

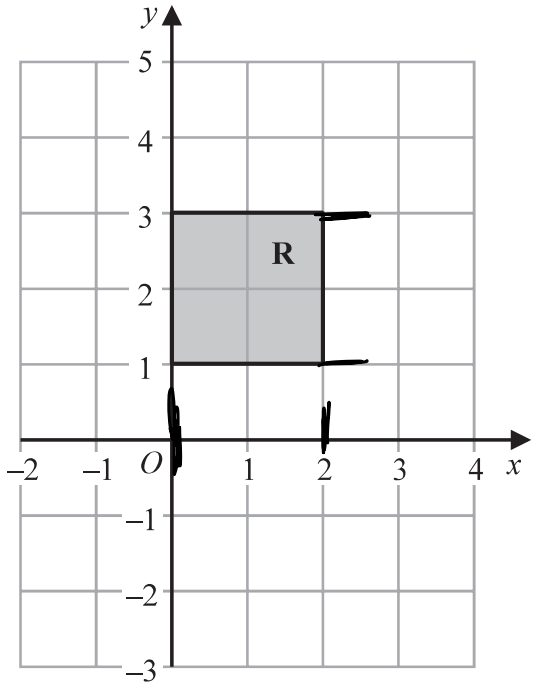
$m = 5$ $\quad -3 = y$ intercept $= c$

$y = mx - c$

$y = 5x - 3$

(2)

(b)



filled lines means including $\leq$ and $\geq$

The region **R**, shown shaded in the diagram, is bounded by four straight lines.

Write down the inequalities that define **R**.

The x values of R are between 0 and 2

The y values of R are between 1 and 3

$0 \leq x \leq 2$, $1 \leq y \leq 3$

(2)

(Total for Question 22 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS