

Answer all TWENTY TWO questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The table shows the land area, in km^2 , of each of six African countries.

Country	Land area (km^2)
Botswana	566 730
Kenya	569 140
Namibia	823 290
Somalia	627 340
Tanzania	885 800
Zambia	743 390

- (a) Write down the name of the country with the greatest land area.

Tanzania

(1)

- (b) Write 823 290 correct to the nearest thousand.

823 000



824 000

823 000

(1)

- (c) Work out the difference between the land area of Botswana and the land area of Kenya.

566 730

569 140

2410

km^2

(1)

The land area of the Gambia is $10\,120\text{ km}^2$

- (d) Write the number 10 120 in words.

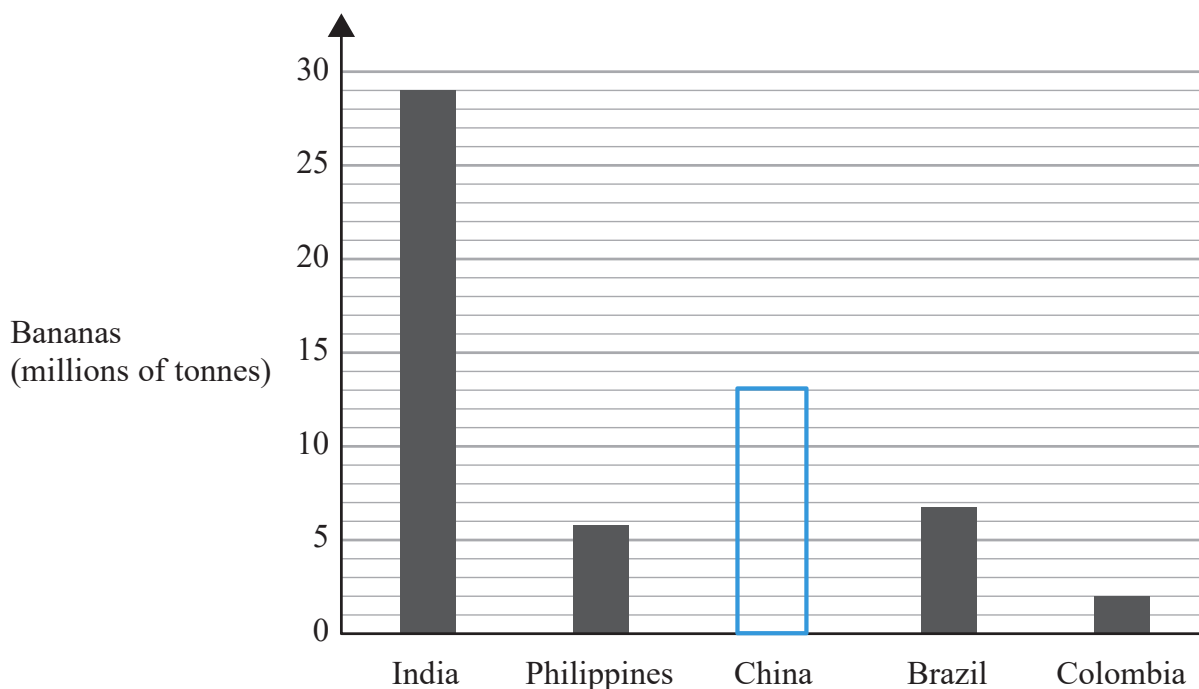
Ten thousand one hundred and twenty

(1)

(Total for Question 1 is 4 marks)



- 2 The bar chart shows information about the weight, in millions of tonnes, of bananas produced by each of four countries in 2016



In 2016, China produced 13 million tonnes of bananas.

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

(1)

One of these countries produced 6.8 million tonnes of bananas in 2016

- (b) Which country?

Brazil

(1)

In 2016, a total of 113 million tonnes of bananas was produced worldwide.

- (c) What fraction of the 113 million tonnes of bananas was produced in India in 2016?

$$\frac{29}{113}$$

$$\frac{29}{113}$$

(2)

(Total for Question 2 is 4 marks)



3 (a) Complete the following sentences by writing a sensible metric unit on each of the dotted lines.

(i) The distance from Cairo to Nairobi is 5211 *kilometres*.....

(ii) The weight of an egg is 20 *grams*.....

(iii) The area of the floor of a classroom is 260 *square metres*.....

(3)

Cara has a bottle of juice.

There is 1 litre of juice in the bottle.

Cara makes some drinks.

She uses exactly 30 millilitres of this juice to make each drink.

Cara makes as many drinks as possible.

(b) How many drinks does Cara make?

$$1000 \div 30 = 33.\dot{3}$$

so 33

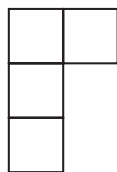
33

(3)

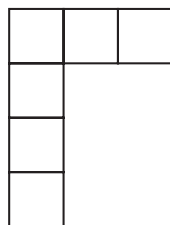
(Total for Question 3 is 6 marks)



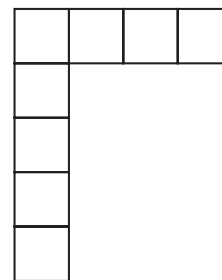
4 Here is a sequence of patterns made from square tiles.



Pattern number 1

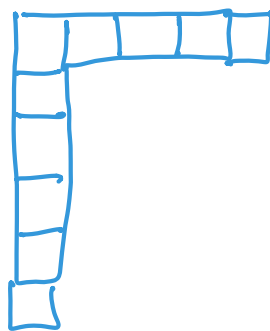


Pattern number 2



Pattern number 3

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



(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of tiles	4	6	8	10	12

$\begin{matrix} \curvearrowright & & \curvearrowright & & \curvearrowright & & \curvearrowright \\ +2 & & +2 & & +2 & & +2 \end{matrix}$

(1)

(c) Work out the number of tiles in Pattern number 30

$$2n + 2$$

$$\begin{aligned} \text{for pattern 30} &= 2 \times 30 + 2 \\ &= 62 \end{aligned}$$

62

(2)



Liz says that in Pattern number n , the number of tiles is $2n$.

(d) Is Liz correct?

You must give a reason for your answer.

No, she is incorrect. It would be $2n+2$

(1)

(Total for Question 4 is 5 marks)

5 Paul is buying a sandwich and a drink in a meal deal.

He can have a cheese sandwich (C) or an egg sandwich (E) or a tomato sandwich (T).

He can have orange juice (O) or milk (M) or water (W) to drink.

Write down all the possible combinations Paul can buy.

CO CM CW EO EM EW TO TM TW

(Total for Question 5 is 2 marks)



6 (a) Write $\frac{1}{4}$ as a decimal.

0.25

(1)

(b) Write $\frac{34}{10}$ as a mixed number in its simplest form.

$$\frac{17}{5} = 3\frac{2}{5}$$

$$17 \div 5 = 3 \text{ r } 2$$

$3\frac{2}{5}$

(2)

(c) Show that $\frac{3}{4} \div \frac{15}{16} = \frac{4}{5}$

$$\frac{3}{4} \div \frac{15}{16} = \frac{\cancel{3}^1}{\cancel{4}_1} \times \frac{\cancel{16}^4}{\cancel{15}_3}$$

$$= \frac{1 \times 4}{1 \times 3} = \frac{4}{3} \text{ as required.}$$

(2)

(Total for Question 6 is 5 marks)

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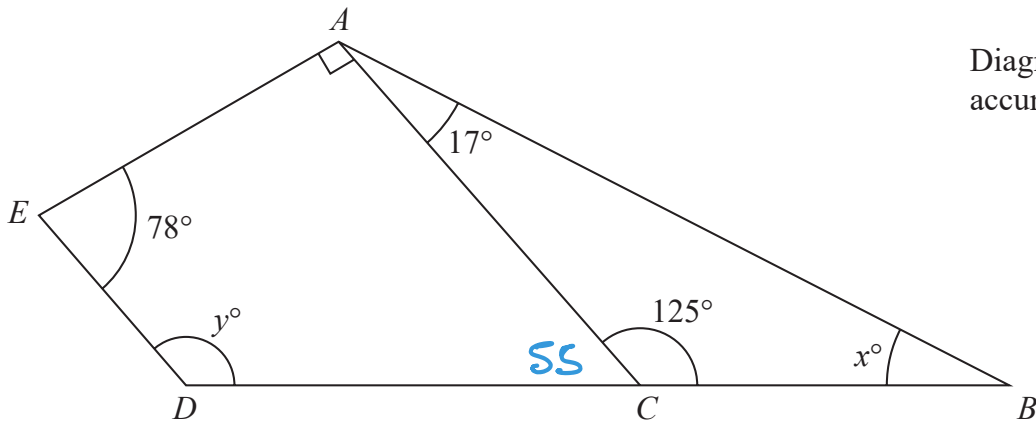


Diagram **NOT**
accurately drawn

$ABDE$ is a quadrilateral.
 ABC is a triangle.
 DCB is a straight line.

- (a) (i) Work out the value of x .

$$180 - (125 + 17)$$

$$x = \underline{38} \quad (1)$$

- (ii) Give a reason for your answer.

angles in a triangle add up to 180°

(1)

- (b) Work out the value of y .
Give a reason for each stage of your working.

$$180 - 125 = 55$$

angles on a straight line add up to 180°

$$360 - (90 + 78 + 55)$$

$$= 360 - 223$$

$$= 137$$

angles in a quadrilateral
add up to 360°

$$y = \underline{137} \quad (3)$$

(Total for Question 7 is 5 marks)



- 8 (a) Simplify $6m - 2k + 5m - k$

$$6m + 5m - 2k - k$$

$$\underline{11m - 3k}$$

(2)

$$P = 2a + 3b$$

- (b) Work out the value of P when $a = 5$ and $b = 8$

$$\begin{aligned} P &= 2 \times 5 + 3 \times 8 \\ &= 10 + 24 \end{aligned}$$

$$P = \underline{34}$$

(2)

$$P = 2a + 3b$$

- (c) Work out the value of a when $P = 16$ and $b = 20$

$$\begin{aligned} 16 &= 2a + 3 \times 20 \\ 2a &= 16 - 60 \\ &= -44 \\ a &= \underline{\underline{\frac{-44}{2}}} \end{aligned}$$

$$a = \underline{-22}$$

(3)

(Total for Question 8 is 7 marks)



- 9 Kamal sells 240 ice creams for a total of \$640

$\frac{1}{3}$ of the ice creams he sells are large.

The cost of each large ice cream he sells is \$3.80

All the other ice creams he sells are small.

He sells each small ice cream for the same cost.

Work out the cost of each small ice cream.

$$240 = \$640$$

LARGE = $\frac{1}{3}$

$$= \frac{240}{3}$$

$$= 80$$

SMALL $\$640 - 304 = 336$

$$240 - 80 = 160$$

$$\$336 \div 160 = 2.1$$

$$80 \times 3.80$$

$$= \$304$$

\$ 2.10

(Total for Question 9 is 4 marks)

- 10 (a) Write the ratio 32 : 80 in its simplest form.

$$\begin{array}{c} 32 : 80 \\ \div 16 \quad \div 16 \\ \hline 2 : 5 \end{array}$$

2 : 5

(2)

There are only red counters and blue counters in a bag.

In the bag

the number of red counters : the number of blue counters = 5 : 7

- (b) What fraction of the counters in the bag are red?

$$\frac{5}{5+7}$$

$\frac{5}{12}$

(1)

(Total for Question 10 is 3 marks)



- 11 Kwo asked 40 people where they went on holiday last year. He is going to draw a pie chart for his results.

16 of the 40 people said they went to Egypt.

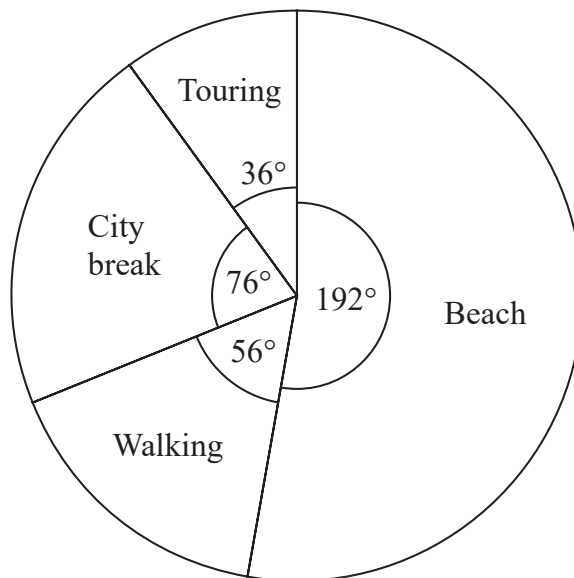
- (a) Work out the size of the angle in the pie chart for Egypt.

$$\frac{16}{40} \times \frac{9}{9} = \frac{144}{360}$$

144

(2)

Tiffany asked some people what type of holiday they each like the best. She used her results to draw this pie chart.



48 of the people that Tiffany asked said they like beach holidays the best.

- (b) Work out how many of the people Tiffany asked said they like walking holidays the best.

$$\begin{array}{l} 192^\circ = 48 \text{ people} \\ \div 48 \end{array} \quad \begin{array}{l} 4^\circ = 1 \text{ person} \\ \div 4 \end{array}$$

$$56 \div 4 = 14$$

14

(2)

(Total for Question 11 is 4 marks)



- 12 Sam takes an English exam.
There are two papers in the exam.
Each paper has a maximum mark of 80

To pass the exam, Sam needs to get at least 60% of the total marks.

Sam gets 55% of the 80 marks in paper 1

Work out the least number of marks that Sam must get in paper 2 to pass the English exam.

$$\begin{array}{l} P1 \\ 0.55 \times 80 \\ = 44 \text{ marks} \end{array}$$

$$\begin{array}{l} P2 \\ 96 - 44 \\ = 52 \text{ needed} \\ \text{on paper 2.} \end{array}$$

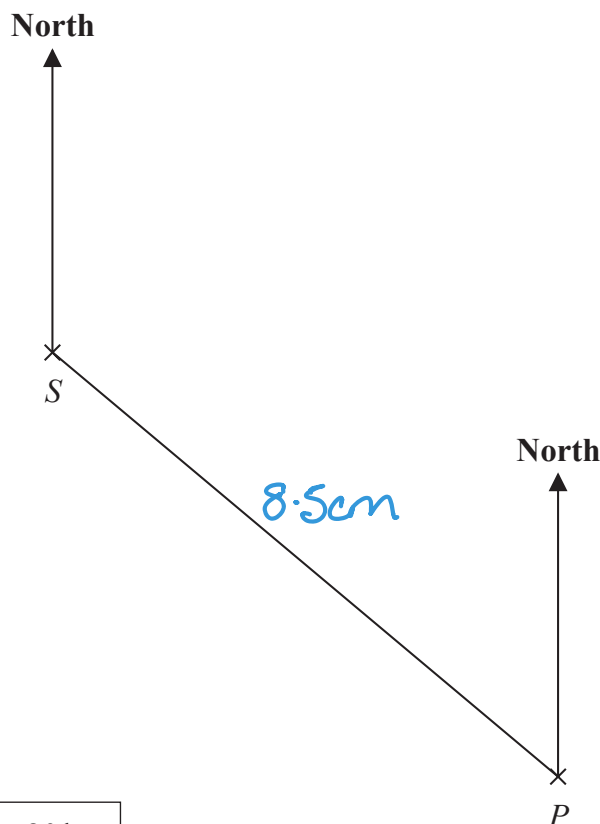
$$\begin{array}{l} \text{TOTAL} \\ 160 \text{ marks} \\ 0.6 \times 160 \\ = 96 \text{ marks} \\ \text{needed.} \end{array}$$

.....52

(Total for Question 12 is 4 marks)



- 13 The scale drawing shows the positions of a ship, S , and a port, P .



Scale: 1 cm represents 20 km

- (a) Find the bearing of S from P .

310

(1)

The ship S now sails directly towards port P .
The ship sails at an average speed of 24 km/h.

- (b) Work out how long it takes the ship to get to P .
Give your answer correct to the nearest hour.

$$D = 8.5 \times 20 = 170 \text{ km}$$

$$S = \frac{D}{T}$$

$$S = 24 \text{ km/hr}$$

$$T = ?$$

$$T = \frac{170}{24}$$

$$= 7.08 \dots$$



(nearest hour)

7

hours

(4)

(Total for Question 13 is 5 marks)



- 14 The point A has coordinates $(5, -4)$
The point B has coordinates $(13, 1)$

(a) Work out the coordinates of the midpoint of AB .

$$\frac{5+13}{2}, \quad \frac{-4+1}{2}$$

$$9, \quad -1.5$$

$$\left(\frac{9}{\dots\dots\dots}, \frac{-1.5}{\dots\dots\dots} \right)$$

(2)

Line L has equation $y = 2 - 3x$

(b) Write down the gradient of line L .

$$y = -3x + 2$$

$$\frac{-3}{\dots\dots\dots}$$

(1)

Line L has equation $y = 2 - 3x$

(c) Does the point with coordinates $(100, -302)$ lie on line L ?
You must give a reason for your answer.

$$\begin{matrix} (100, -302) \\ x \quad y \end{matrix}$$

$$y = 2 - 3 \times 100 = 2 - 300 = -298$$

No, it goes through $(100, -298)$

(1)

(Total for Question 14 is 4 marks)



15 (a) Find the highest common factor (HCF) of 28 and 70

$$\begin{aligned} 28 &= 4 \times 7 \\ &= 2 \times 2 \times 7 \end{aligned}$$

$$\begin{aligned} 70 &= 7 \times 10 \\ &= 7 \times 2 \times 5 \end{aligned}$$

$$\text{HCF} = 7 \times 2$$

14

(2)

(b) Find the lowest common multiple (LCM) of 28 and 105

$$28 = 2^2 \times 7$$

$$\begin{aligned} 105 &= 5 \times 21 \\ &= 5 \times 3 \times 7 \\ &= 3 \times 5 \times 7 \end{aligned}$$

$$\text{HCF} = 7$$

$$\begin{aligned} \text{LCM} &= 2^2 \times 3 \times 5 \times 7 \\ &= 420 \end{aligned}$$

420

(2)

(Total for Question 15 is 4 marks)

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16 The diagram shows a shape.

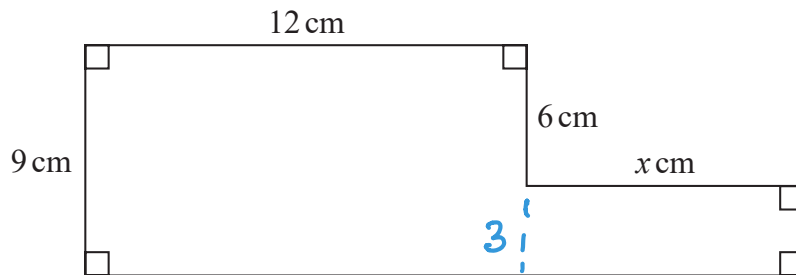


Diagram NOT
accurately drawn

The shape has area 129 cm^2

Work out the value of x .

$$12 \times 9 + 3x = 129$$

$$3x = 129 - 108$$

$$3x = 21$$

$$x = \frac{21}{3}$$

$$x = \dots\dots\dots 7 \dots\dots\dots$$

(Total for Question 16 is 4 marks)

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DO NOT WRITE IN THIS AREA



17 The table shows information about the weights, in kilograms, of 40 babies.

Weight (w kg)	Frequency
$2 < \overset{2.5}{w} \leq 3$	12
$3 < \overset{3.5}{w} \leq 4$	16
$4 < \overset{4.5}{w} \leq 5$	9
$5 < \overset{5.5}{w} \leq 6$	2
$6 < \overset{6.5}{w} \leq 7$	1
	<u>40</u>

(a) Write down the modal class.

$$\underline{3 < w \leq 4}$$

(1)

(b) Work out an estimate for the mean weight of the 40 babies.

$$\begin{aligned} 2.5 \times 12 + 3.5 \times 16 + 4.5 \times 9 + 5.5 \times 2 + 6.5 \times 1 \\ = 30 + 56 + 40.5 + 11 + 6.5 \\ = 144 \end{aligned}$$

$$\text{Mean} = \frac{144}{40}$$

$$\underline{3.6} \text{ kg}$$

(4)

One of the 40 babies is going to be chosen at random.

(c) Find the probability that this baby has a weight of more than 5 kg.

$$> 5 = 2 + 1 = 3$$

$$\underline{\frac{3}{40}}$$

(2)

(Total for Question 17 is 7 marks)



- 18 120 children go on an activity holiday.
The ratio of the number of girls to the number of boys is 3:5

On Sunday, all the children either go sailing or go climbing.

$\frac{16}{25}$ of the boys go climbing.

Twice as many girls go sailing as go climbing.

Work out how many children go sailing on Sunday.

$$120$$

$$G : B$$

$$3 : 5$$

$$120 \div 8 = 15$$

$$3 \times 15 = 45$$

$$5 \times 15 = 75$$

Sunday G = 45

$$\text{climbing} = 15$$

$$\text{sailing} = 30$$

B = 75

$$\text{climbing} = \frac{16}{25} \times 75$$

$$= 48$$

$$\text{sailing} = 75 - 48 = 27$$

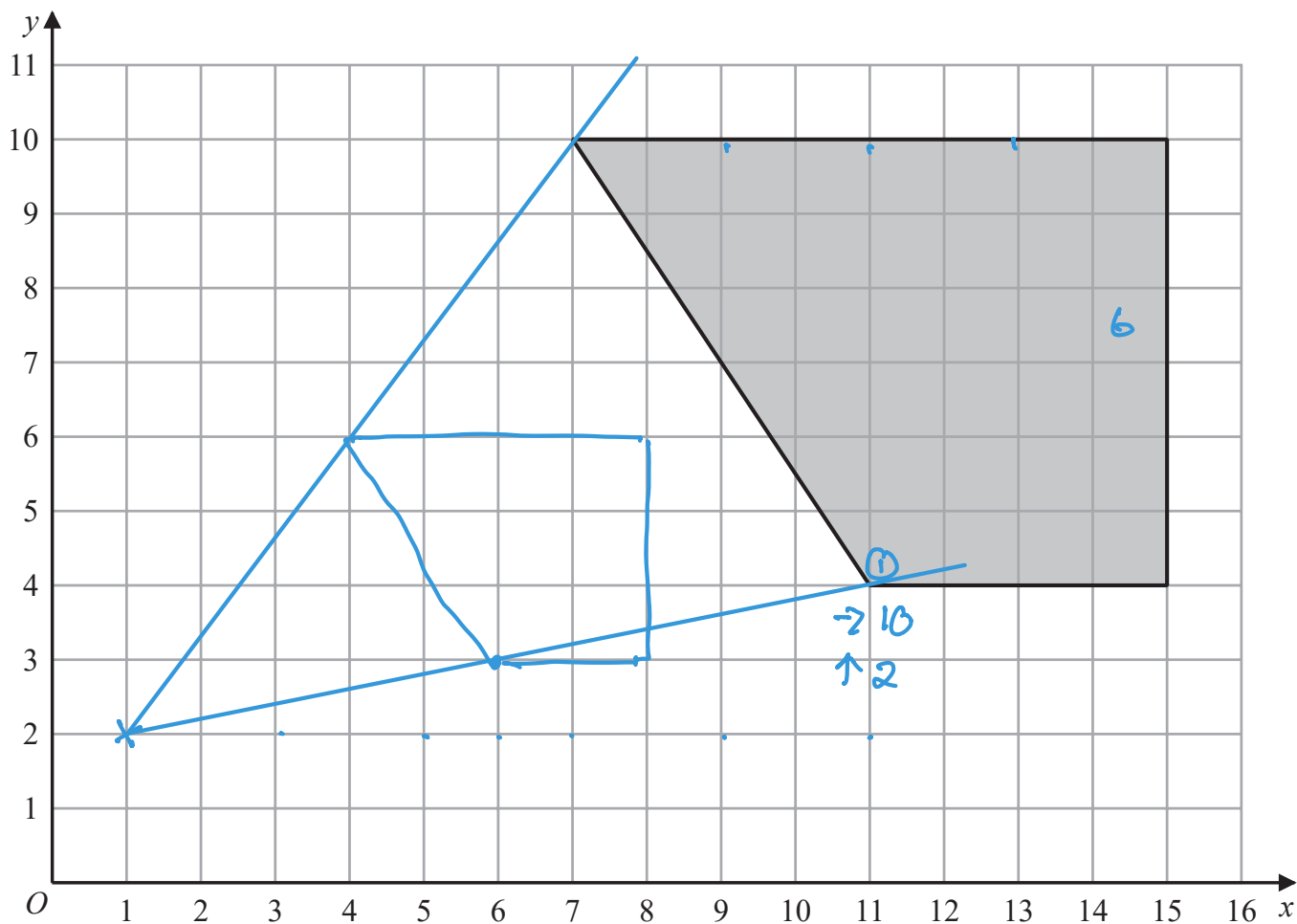
$$\begin{aligned} \text{Sailing total} &= 30 + 27 \\ &= 57 \end{aligned}$$

57

(Total for Question 18 is 6 marks)



19



On the grid, enlarge the shaded shape with scale factor $\frac{1}{2}$ and centre (1, 2)

① → 5 ↑ 1

(Total for Question 19 is 2 marks)



20 (a) Write 7.8×10^{-4} as an ordinary number.

0.00078

(1)

(b) Work out $\frac{5.6 \times 10^4 + 7 \times 10^3}{2.8 \times 10^{-3}}$

Give your answer in standard form.

63000
0.0028

= 22500000

2.25 × 10⁷

(2)

(Total for Question 20 is 3 marks)



21 (a) Expand and simplify $(m - 8)(m + 5)$

$$m \times m = m^2$$

$$m \times 5 = 5m$$

$$-8 \times m = -8m$$

$$-8 \times 5 = -40$$

$$\frac{m^2 - 3m - 40}{(2)}$$

(b) Factorise fully $5y + 20y^2$

$$\frac{5y(1 + 4y)}{(2)}$$

(c) Simplify $(p^2 + 3)^0$

$$\frac{1}{(1)}$$



(d) Solve $3(2x - 5) = \frac{9 - x}{2}$

Show clear algebraic working.

$$\times 2 \quad 6(2x - 5) = 9 - x$$

$$12x - 30 = 9 - x$$
$$+x \qquad \qquad \qquad +x$$

$$13x - 30 = 9$$
$$+30 \qquad \qquad +30$$

$$13x = 39$$

$$x = \frac{39}{13}$$

$$x = \underline{\quad 3 \quad}$$

(4)

(Total for Question 21 is 9 marks)

Turn over for Question 22



22 Here is a right-angled triangle.

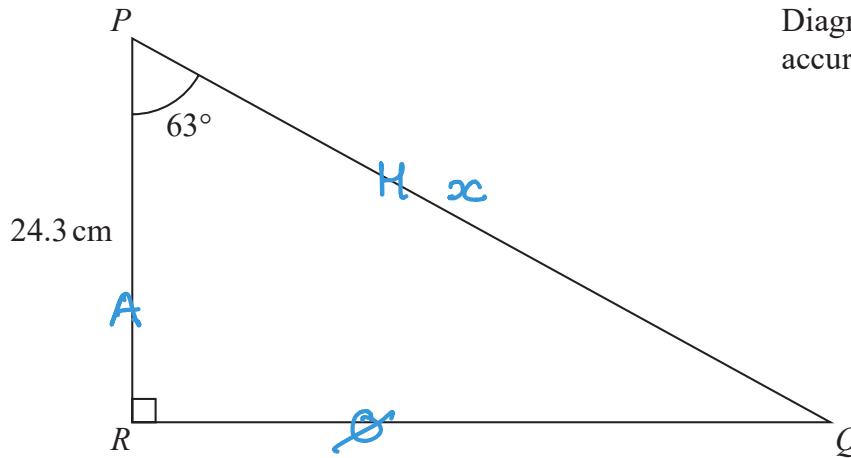


Diagram NOT accurately drawn

Calculate the length of PQ . x
Give your answer correct to 3 significant figures.

$$\cos 63 = \frac{24.3}{x}$$

$$\begin{aligned} x &= \frac{24.3}{\cos 63} \\ &= 53.5253 \dots \\ &\quad \uparrow \\ &\quad (3 \text{ sf}) \end{aligned}$$

53.5 cm

(Total for Question 22 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

