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Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015

Mathematics

Unit T2 **(With calculator)**
Foundation Tier

[GMT21]

GMT21

THURSDAY 21 MAY, 9.15 am–10.45 am

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in blue or black ink only. **Do not write with a gel pen**.
Answer **all twenty-eight** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **Questions 9** and **13**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

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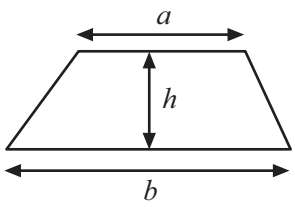
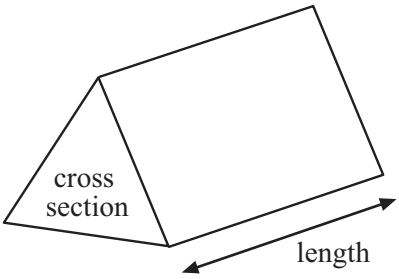
Formula Sheet

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



Volume of prism = area of cross section × length



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1 Write down the next two terms in the following sequence

18, 17, 14, 9, _____ , _____ [2]

2 Simplify $4a + 3b - a - 5b$

Answer _____ [2]

3

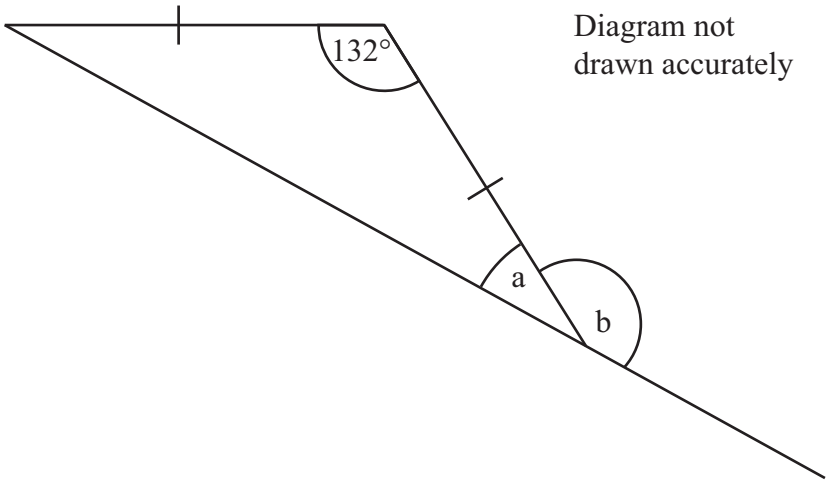

Diagram not drawn accurately

Find the size of

(a) angle a

Answer a = _____° [2]

(b) angle b

Answer b = _____° [1]

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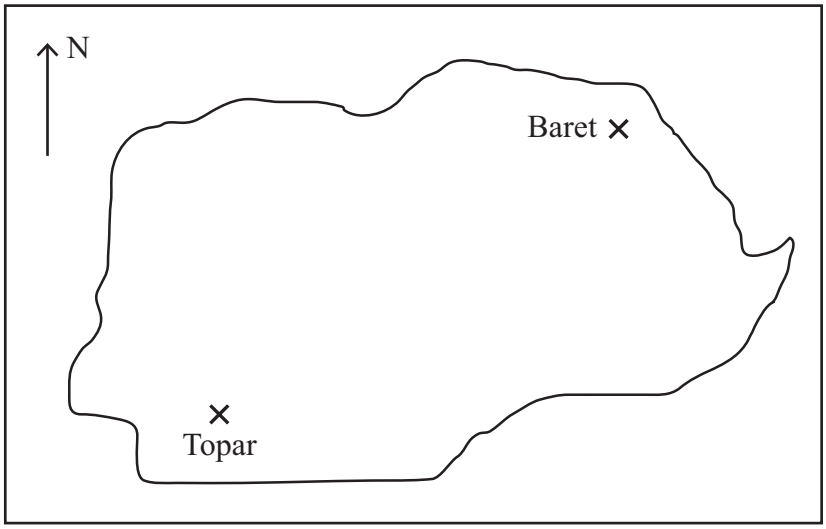
4



In the map above the scale is 1 cm = 60 km

Find the actual distance between Baret and Topar.

Answer _____ km [3]

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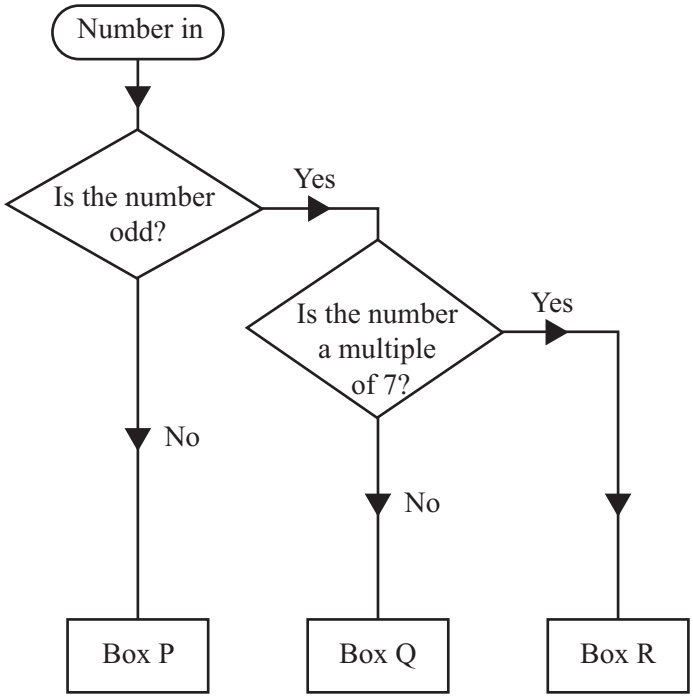
5



Using the decision tree diagram, name the box for

(a) 25 Answer Box _____

(b) 22 Answer Box _____

(c) 21 Answer Box _____ [2]

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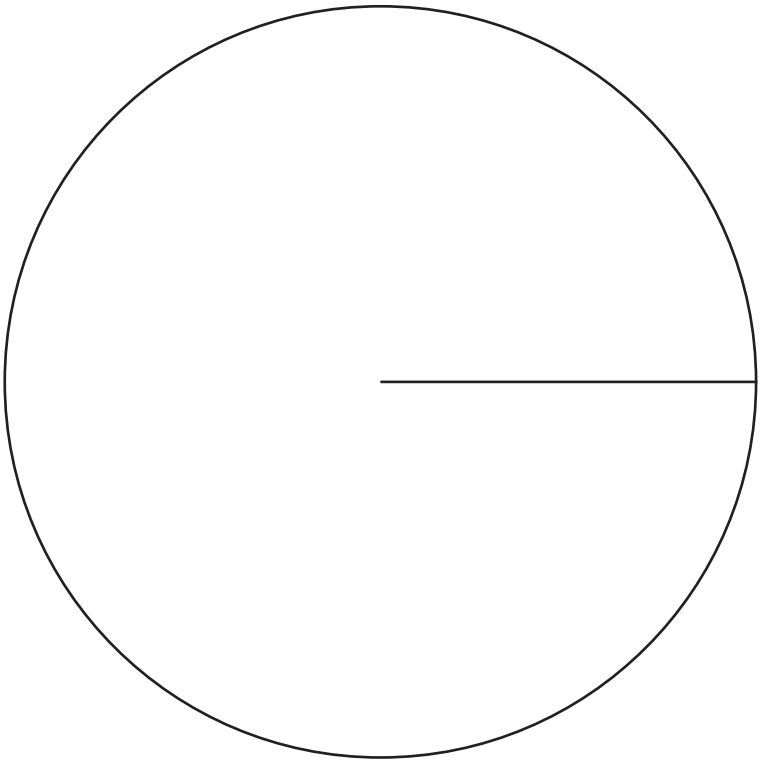
6 The amount of fruit sold in a canteen was recorded as follows.

Fruit	Frequency	Angle
Oranges	30	
Apples	42	
Pears	23	
Bananas	25	

Draw a pie chart to illustrate this information.



[4]

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7 The stem and leaf diagram shows the weights of some babies.

2	4 6 8 8
3	0 5 5 5 7 8 9
4	1 2 2 3 6
5	1

Key 2 | 4 = 2.4 kg

(a) Find

(i) the range,

Answer _____ kg [1]

(ii) the mode,

Answer _____ kg [1]

(iii) the median.

Answer _____ kg [1]

(b) A mistake was made. The weight of 4.6 kg should have been 4.5 kg.
Which of the following will change?
Circle the correct answer.

range median mean mode

[1]

[Turn over

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8 Write $\frac{3}{8}$, 0.4 and 35% in ascending order of size.
Show your working.

Answer _____ , _____ , _____ [3]

Quality of written communication will be assessed in this question.

9 Tom works 30 hours each week.
He earns £9.50 per hour.
He saves one-fifth of his earnings each week.
He wants to buy a guitar costing £840
How many weeks does it take Tom to save enough to buy the guitar?
You must show all your working.

Answer _____ weeks [5]

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10 The total cost of 4 kg of pears and 3 kg of bananas is £14.55
Pears cost £2.55 per kg.
Work out the cost of 1 kg of bananas.

Answer £ _____ [4]

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11 A company makes 500 rag dolls.
It costs £3.14 to make each rag doll.
25% of the rag dolls are given to a local charity.
Of the rest, four-fifths are sold for the full price of £5
The remainder are then sold at half-price.
How much profit does the company make?

Answer £ _____ [6]

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(Questions continue overleaf)

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12 A salesman recorded the average temperature (°C) and his cold drink sales (£) during 8 weeks of the summer.

	Week 1	**Week 2**	**Week 3**	Week 4	Week 5	Week 6	Week 7	Week 8
Average Temperature (°C)	**12**	**14**	**18**	13	16	15	14	18
Sales (£)	**204**	**268**	**392**	236	328	298	282	380

The first three points have already been plotted.

(a) Use the data to complete the scatter graph. [2]

(b) Draw the line of best fit. [1]

(c) In week 9 the average temperature was 17°C.

Estimate the sales for week 9

Answer £ _____ [1]

(d) What type of correlation does your graph show?

Answer _____ [1]

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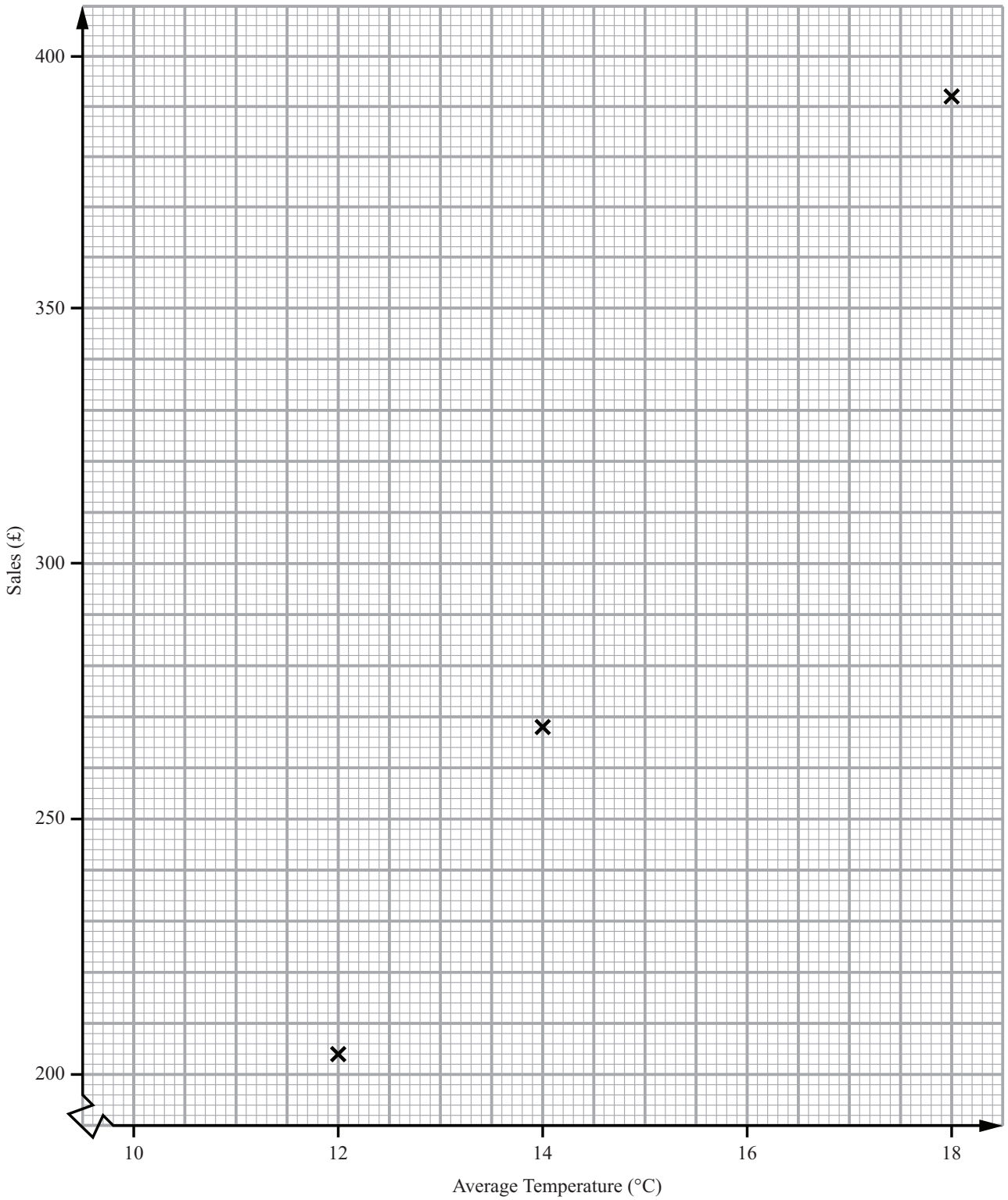

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Quality of written communication will be assessed in this question.

13 Jean and Joyce are both pupils at Eastwood Girls High School and they want to know how many times a month, on average, the people in their town go to church.

(a) Jean asks 300 pupils in her school.

Give **two** reasons why Jean's sample may not be representative of the people in her town.

Reason 1 _____

_____ [1]

Reason 2 _____

_____ [1]

(b) Joyce stands outside her local church and asks 300 people on their way in to church.

Give **one** reason why Joyce's sample is biased.

Reason _____

_____ [1]

14 An airport had 123 planes departing one day.
46 of these planes departed late.
What percentage were late?
Give your answer correct to one decimal place.

Answer _____ % [3]

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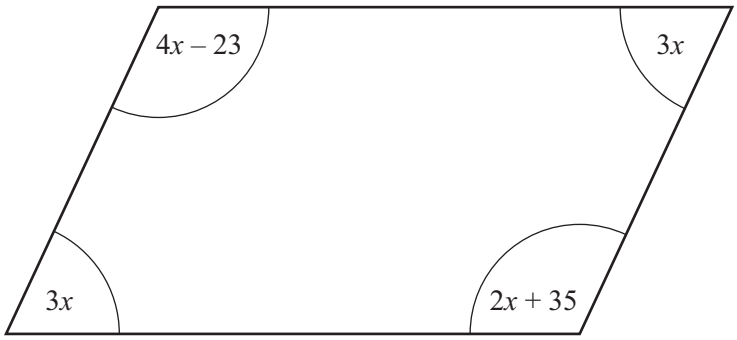
15 Grapefruit cost g pence each.
Mangoes cost m pence each.
Sarah buys 3 grapefruit and 4 mangoes.
The total cost is £5
Write down an equation containing g and m.

Answer _____ [3]

16



The diagram above is a parallelogram.
The sizes of the angles in degrees are $3x$, $4x - 23$, $3x$ and $2x + 35$
Work out the value of x.

Answer x = _____ [3]

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17 The price of a coat in a shop is £129
Pat has £100 but he has also a discount card which allows him 20% off the shop price.
Does he have enough money to buy the coat using his discount card?
You must show working to explain your answer.

[3]

18 a and b are different prime numbers less than 20

(a) Find a value for a and a value for b so that $a + b$ is a square number.

Answer $a =$ _____ , $b =$ _____ [2]

(b) Find a value for a and a value for b so that $a + b$ is a **different** square number.

Answer $a =$ _____ , $b =$ _____ [2]

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19 A regular polygon has an interior angle of 150°

(a) How many sides does it have?

Answer _____ [2]

Two of these polygons are placed edge to edge.

(b) What regular shape would fit exactly in the space beside these touching edges?

Answer _____ [2]

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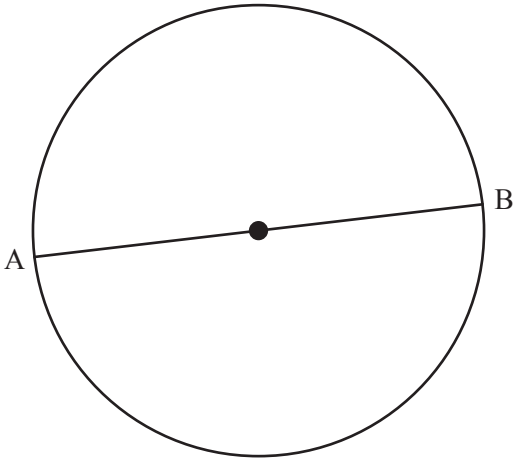
20

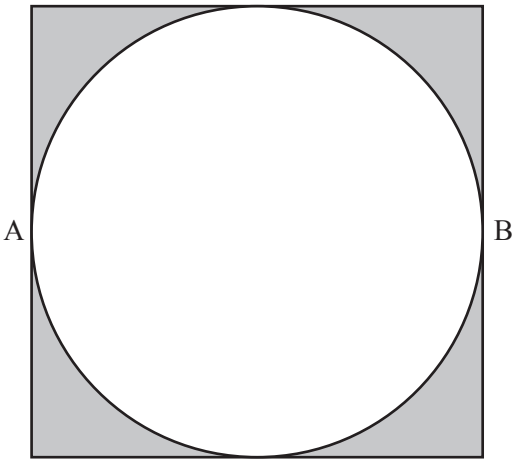


(a) AB is a diameter of the circle. AB is 13 cm.

Calculate the area of the circle.

Answer _____ [3]

(b) This circle is now set inside a square as shown. Find the shaded area.



Answer _____ [2]

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21 Solve the equation $\frac{4y}{5} - 3 = 9$

Answer $y =$ _____ [3]

22 Five years ago 123 million CDs were sold in the UK.
69.4 million were sold last year.
Work out the percentage fall in sales of CDs.

Answer _____ % [3]

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23 100 shoppers were asked how much they spent on food in one week.

Amount spent (£P)	Frequency
$20 < P \leqslant 40$	8
$40 < P \leqslant 60$	30
$60 < P \leqslant 80$	28
$80 < P \leqslant 100$	27
$100 < P \leqslant 120$	5
$120 < P \leqslant 140$	2

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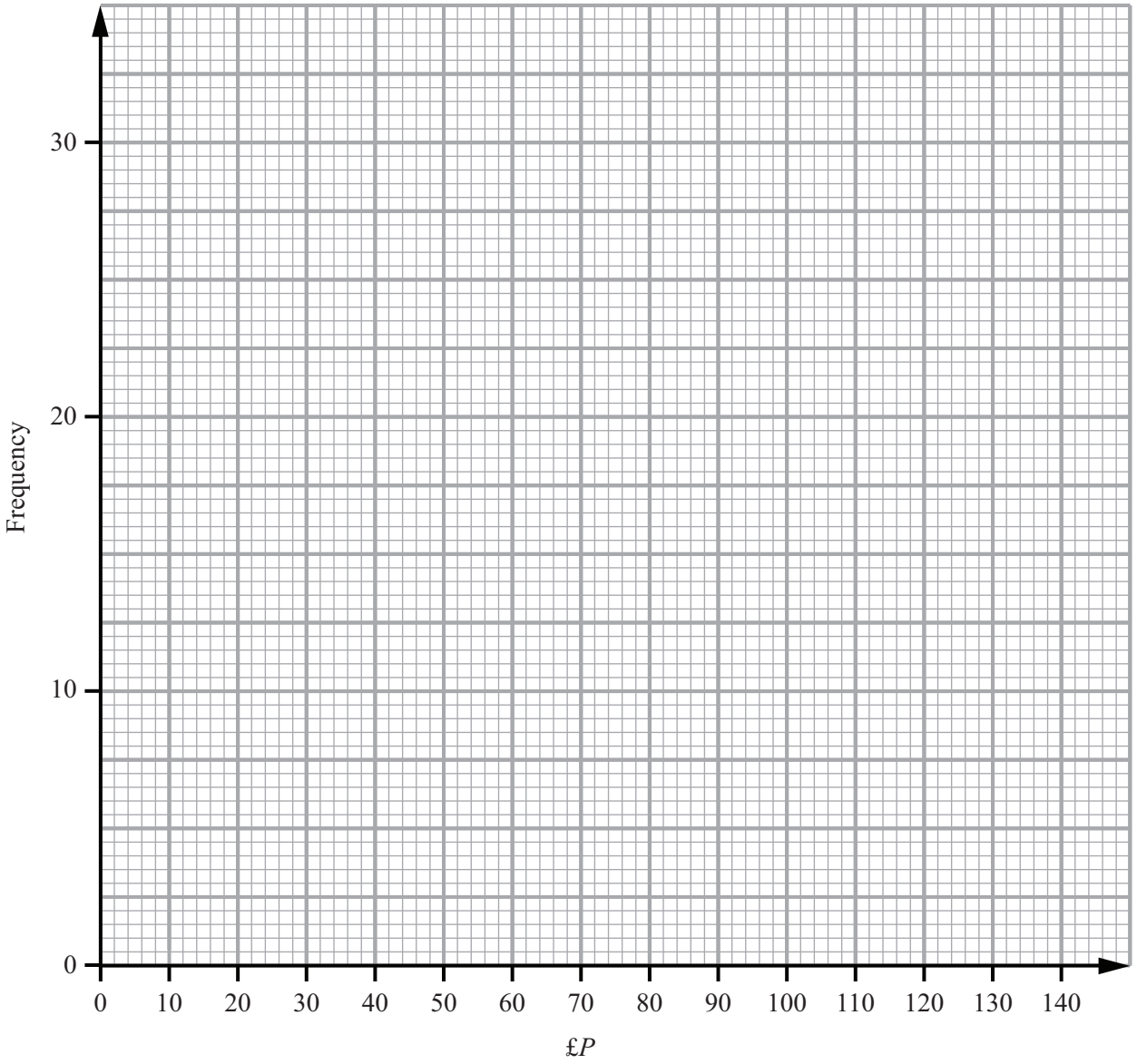
(a) Draw a frequency polygon to show this information. [2]



(b) Which class interval contains the median?

Answer _____ [1]

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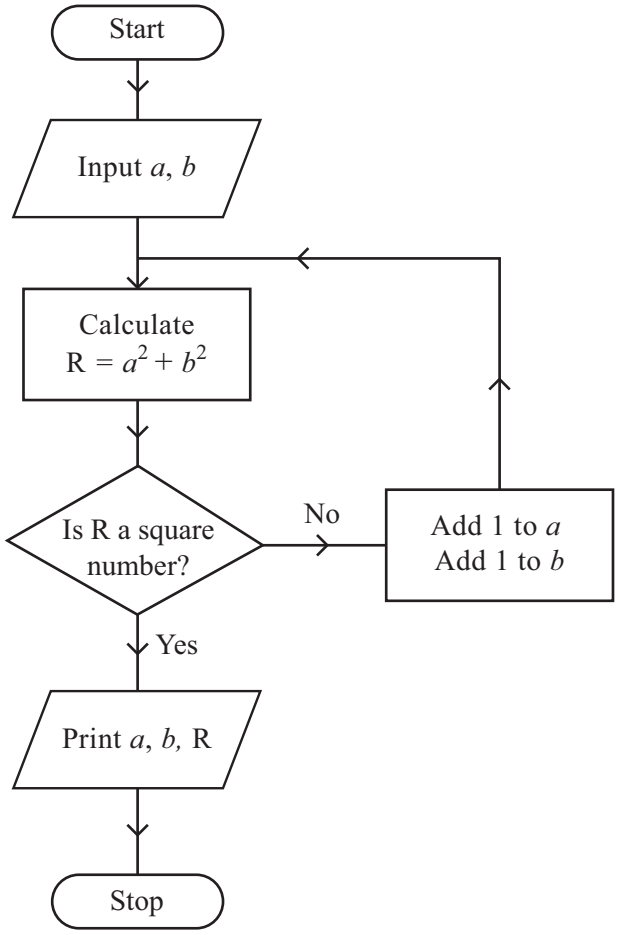

Starting with $a = 6$, $b = 13$ use the flow chart to find the values printed.

a	b	R
6	13	

Answer $a =$ _____ , $b =$ _____ , R = _____ [3]

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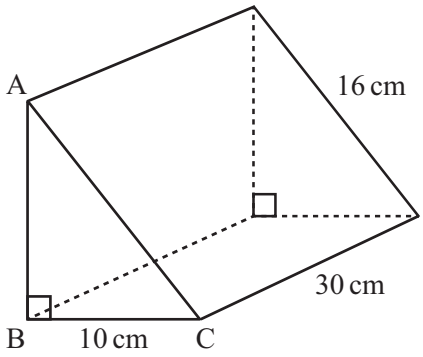
25 In the triangular prism ABC is a right-angled triangle.



(a) Calculate the length of AB.

Answer _____ cm [3]

(b) Calculate the volume of the prism.

Answer _____ cm^3 [3]

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26 The equation $x^3 + 4x^2 = 100$ has a solution between 1 and 5
Use a trial and improvement method to find this solution.
Give your answer correct to one decimal place.
You must show all your working.

Answer $x =$ _____ [4]

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27 John thinks of a number.
He multiplies it by 9 and subtracts 4
The answer is three times the number he started with.
Work out the starting number.

Answer _____ [2]

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28 **(a)** **(i)** Write 30 as a product of prime factors.

Answer 30 = _____ [1]

(ii) Write 22 as a product of prime factors.

Answer 22 = _____ [1]

(b) An airport bus leaves the city hall every 30 minutes.
A shuttle bus leaves the city hall every 22 minutes.
An airport bus and a shuttle bus both leave the city hall at 8.00 am.
At what time will an airport bus and a shuttle bus next leave the city hall at the same time?

Answer _____ [3]

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