Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017

Mathematics

Unit T2
(With calculator)
Foundation Tier

GMT21

[GMT21]

THURSDAY 25 MAY, 9.15am–10.45am

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 black ink only. **Do not write with a gel pen.**
Answer **all twenty-nine** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

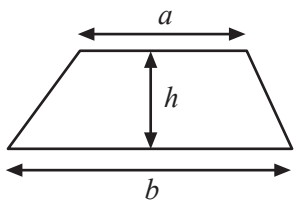
INFORMATION FOR CANDIDATES

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 Question **29**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

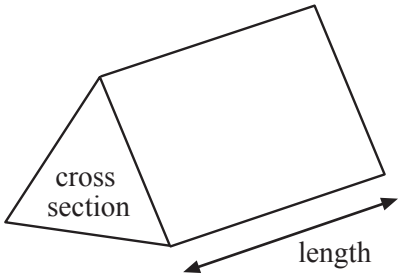
10601

Formula Sheet

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



Volume of prism = area of cross section × length



10601

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(Questions start overleaf)

1 **(a)** Calculate $\frac{4}{0.8^2}$

Answer _____ [2]

(b) Calculate $1.4^2 + \sqrt{2.89}$

Answer _____ [1]

2 Karen needs a taxi to make a journey of 7.6 miles. She can use TOM'S TAXI or TAXI FOR U.

TOM'S TAXI

First mile (or part) £2.50

Each extra mile (or part) £1

TAXI FOR U

First mile (or part) £2.80

Each extra mile (or part) 80p

Which taxi firm should she use and how much cheaper is it?

Show your working clearly.

Answer _____

£ _____ [3]

[Turn over

3 **(a)** Four equilateral triangles and a square are joined together as shown in the diagram.

Calculate the size of angle g.

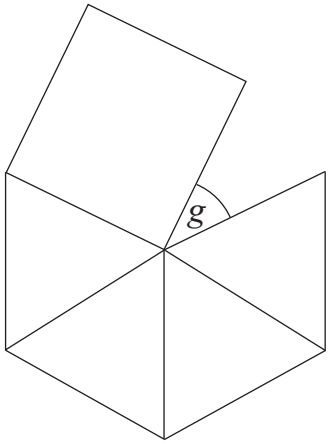


diagram not
drawn accurately

Answer $g =$ _____ ° [3]

(b) An equilateral triangle and a regular pentagon are joined together as shown in the diagram.

Calculate the size of angle h.

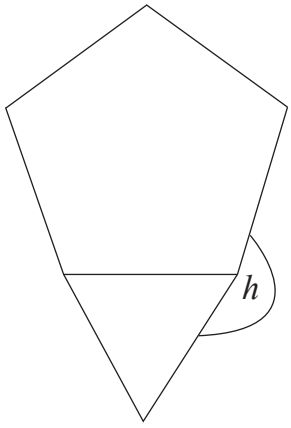


diagram not
drawn accurately

Answer _____ ° [3]

4 Write $\frac{5}{8}$, 0.7 and 65% in ascending order of size.

Show your working.

Answer _____, _____, _____ [3]

5 Solve

(a) $\frac{x}{5} = 10$

Answer x = _____ [1]

(b) $2x + 5 = 12$

Answer x = _____ [2]

[Turn over

6 The exchange rate between pounds and euro is £1 = €1.35

Sam buys a coat for €108

How much does the coat cost in (£) pounds?

Answer £ _____ [2]

7 Without using a calculator, show how to work out

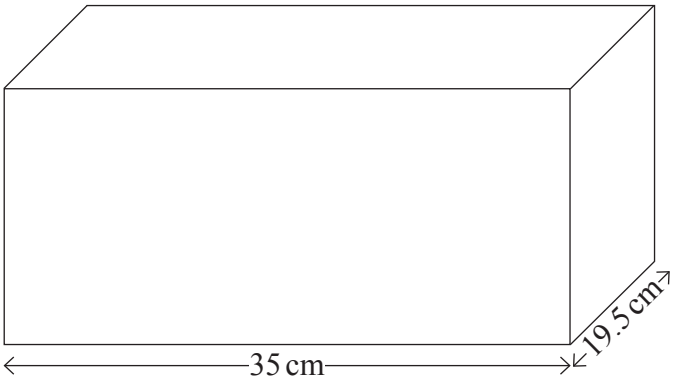
$$\frac{7}{12} - \frac{1}{4}$$

Write your answer in its simplest form.

Answer _____ [2]

8 **(a)** A shoebox has length 35 cm and breadth 19.5 cm.

Its volume is 8463 cm^3



Work out the height of the shoebox.

Answer _____ cm [2]

(b) A different shoebox has dimensions 30 cm by 20 cm by 10 cm.

Find the dimensions of a large cuboid box which will hold exactly 8 of these shoeboxes.

Answer _____ cm by _____ cm by _____ cm [2]

[Turn over

9 On a diagram the distance between Belfast and Liverpool is 6.5 cm.

The bearing of Liverpool from Belfast is 135°

Show the position of Liverpool on the diagram below.

Mark it clearly with ×.

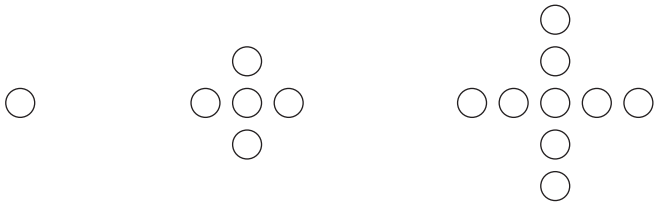
[2]

10601

10 Write down the next two terms in the sequence

23, 21, 17, 11, _____ , _____ [2]

11 Here is a sequence of patterns made with circles.



pattern 1 pattern 2 pattern 3

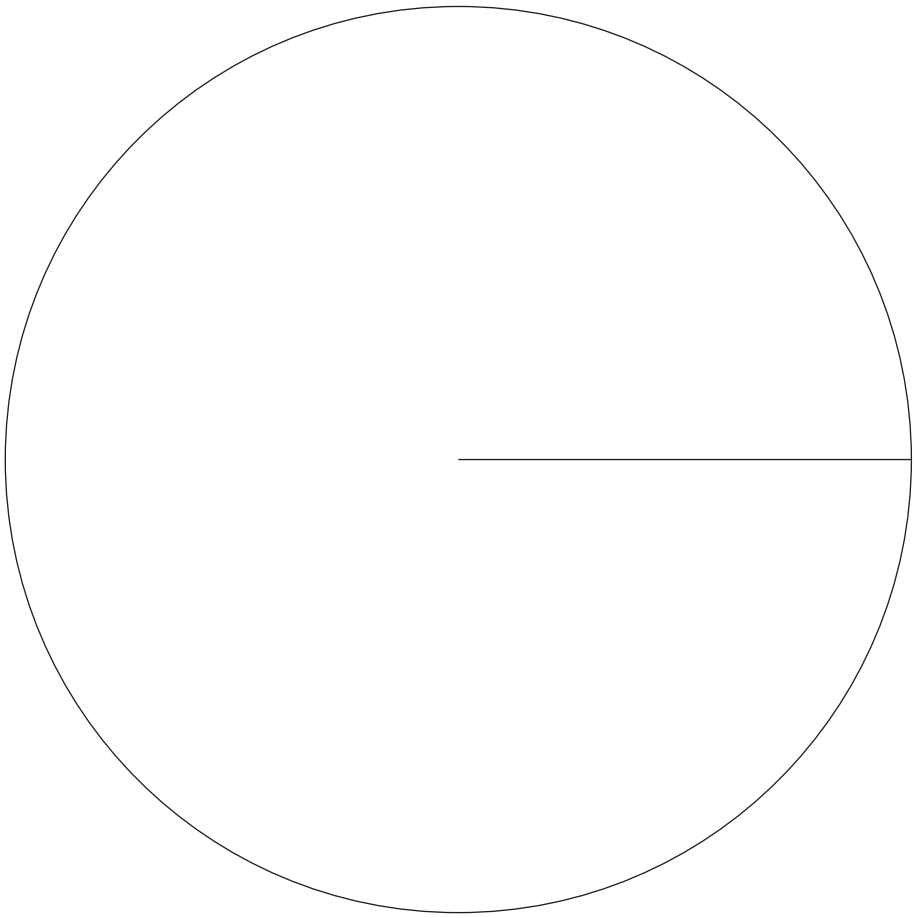
How many circles are needed for pattern 5?

Answer _____ because the rule is _____ [2]

12 The number of drinks sold one day is shown below.

Orange	30	
Lemonade	27	
Cola	42	
Water	21	

Draw a pie chart to show this.



[4]

13 The stem and leaf diagram shows the ages of people who took their driving test one day.

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

Key 1 | 7 = 17 years

(a) Find

(i) the mode,

Answer _____ [1]

(ii) the median,

Answer _____ [1]

(iii) the range.

Answer _____ [1]

(b) A quarter of these people were above a certain age.

What was that age?

Answer _____ [2]

[Turn over

14 The number of goals scored in each match of a competition was recorded.

Number of goals scored in a match	Frequency
1	9
2	8
3	6
4	3
5	4

Calculate the mean number of goals per match.

Answer _____ [3]

15 A box contains 560 g of cornflakes.

A box on special offer contains an extra 35% of cornflakes.

How many grams of cornflakes are in the special offer box?

Answer _____ g [3]

16 Solve $4(x - 5) = 48$

Answer $x =$ _____ [3]

17 Jill bought 3 oranges at x pence each and 4 melons at $2x$ pence each.

(a) Write down an expression for the total cost in terms of x pence.

Answer _____ [1]

(b) She got £1.04 change from £5

Write down an equation in terms of x.

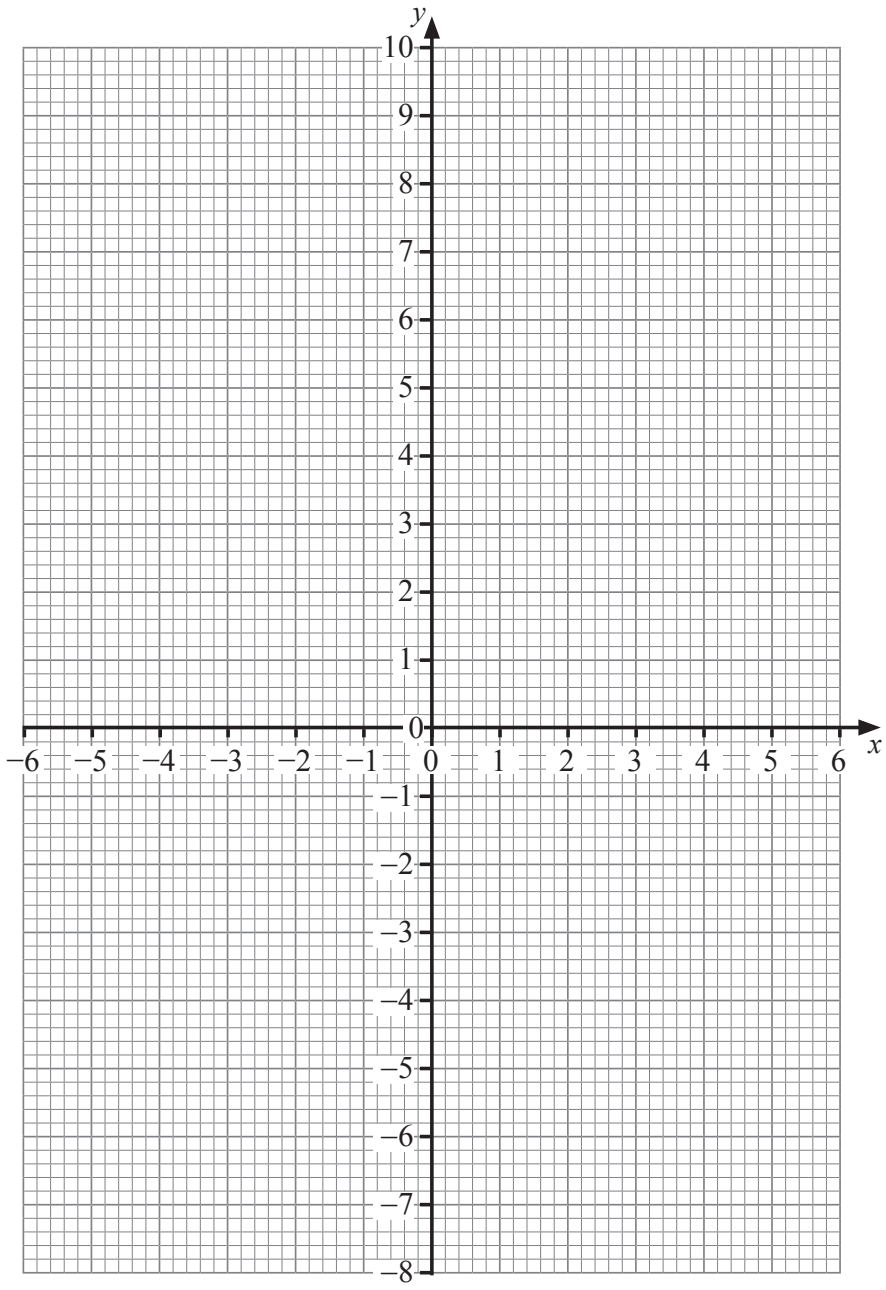
Answer _____ [1]

(c) Solve the equation to find the value of x.

Answer $x =$ _____ [2]

[Turn over

18 **(a)** Draw the graph of $y = 4x - 3$ on the grid below.



[3]

(b) The graph of $y = 4x - 3$ crosses the line $y = 5$ at the point P.

Write down the coordinates of P.

Answer (___ , ___) [1]

19 **(a)** Calculate the circumference of a circle with diameter 2 m.

Answer _____ m [2]

(b) Hence calculate the perimeter of the window below, which is made up of a semicircle and a rectangle.

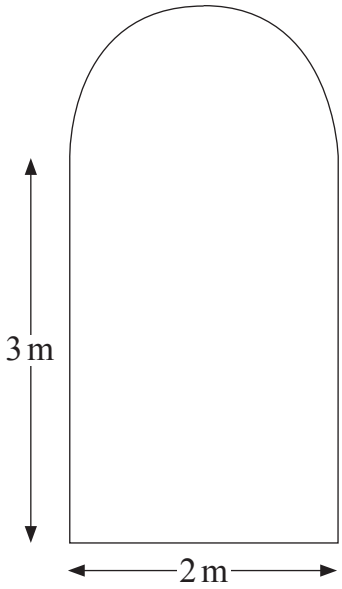


diagram not
drawn accurately

Answer _____ m [2]

[Turn over

20 A salesman recorded the average temperature (°C) and his ice-cream 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)	**13**	**12**	**14**	16	14	18	17	18
Sales (£)	**238**	**206**	**264**	330	272	398	364	392

(a) The first three points have already been plotted.
Use the data to complete the scatter graph. [2]

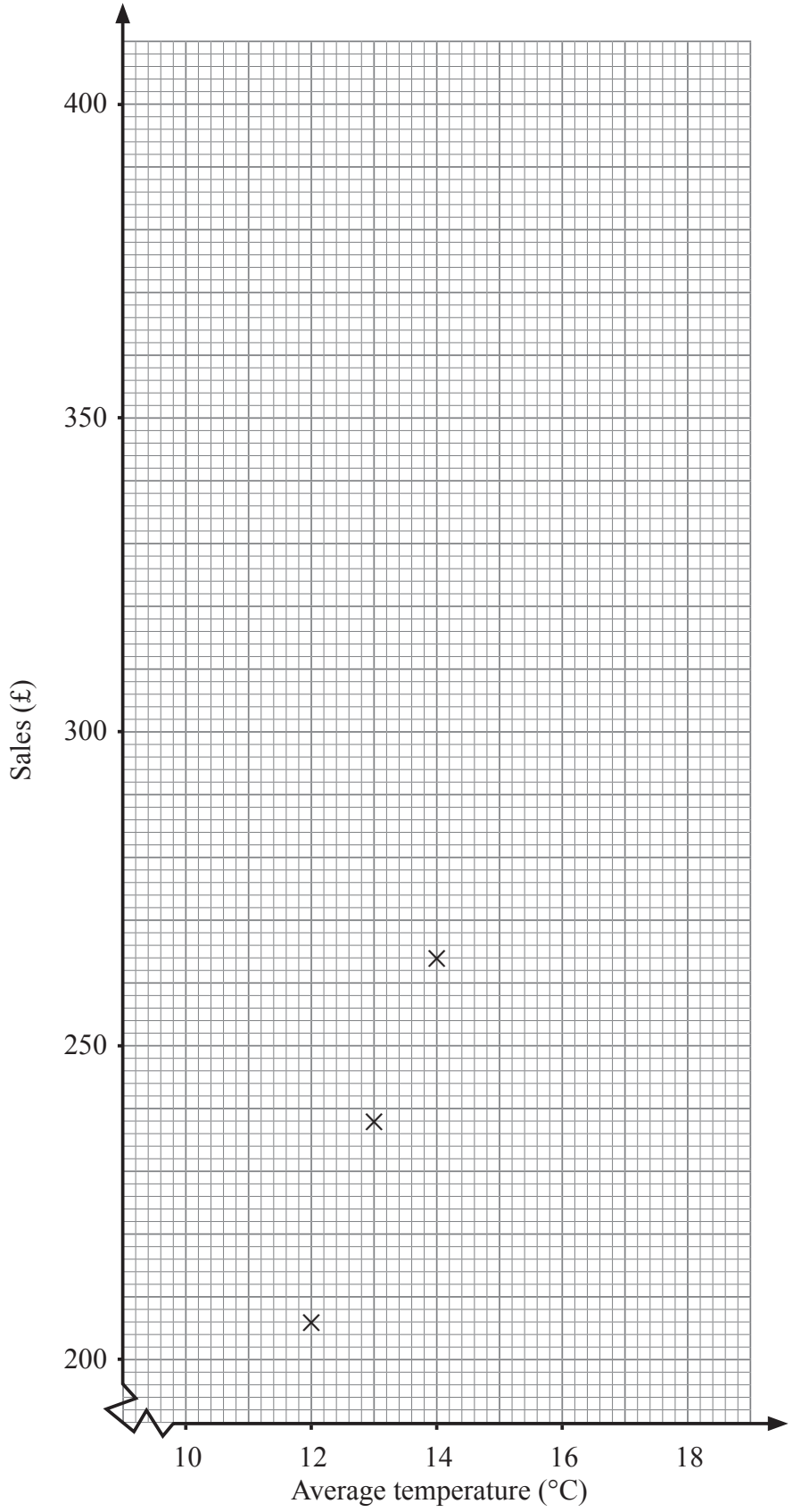
(b) Draw the line of best fit. [1]

(c) In Week 9 the average temperature was 15 °C.
Use the graph to estimate the sales for Week 9

Answer £ _____ [1]

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

Answer _____ [1]



[Turn over

21

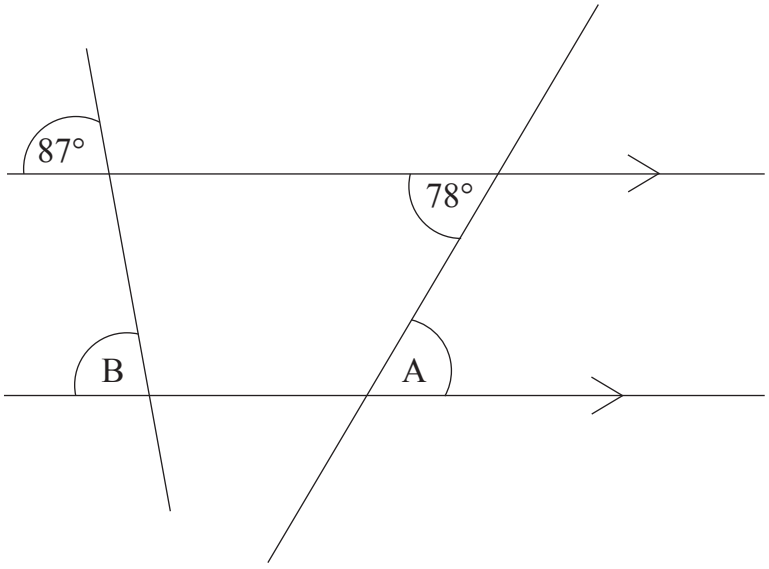


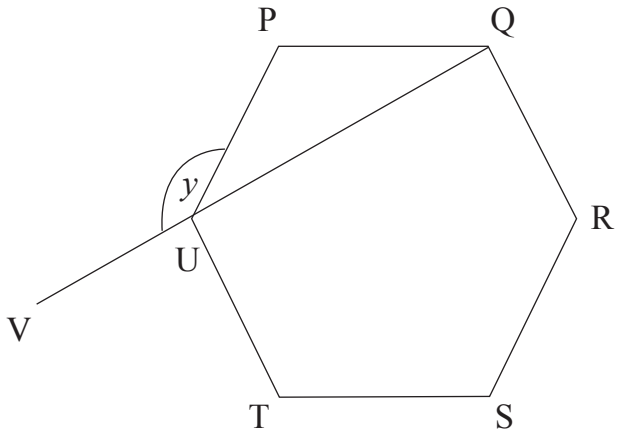
diagram not drawn accurately

Find the size of angle

(a) A Answer _____° [1]

(b) B Answer _____° [1]

22 PQRSTU is a regular hexagon.
QUV is a straight line.
Show that angle y is 150°
Give reasons for each step of your work.



[4]

[Turn over

23 The area of the right-angled triangle PQR is $24 m^2$

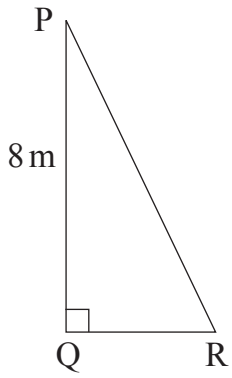


diagram not drawn accurately

Calculate the length of PR.

Show all your working.

Answer _____ m [4]

24 **(a)** Write 96 as a product of prime factors.

Give your answer in index notation.

Answer _____ [3]

(b) Hence find the highest common factor of 96 and 72

Answer _____ [2]

[Turn over

25 The first four terms of a sequence are

3, 8, 13, 18, ...

(a) Write down the n^{th} term of the sequence.

Answer _____ [2]

(b) Which term of the sequence will equal 73?

Answer _____ [1]

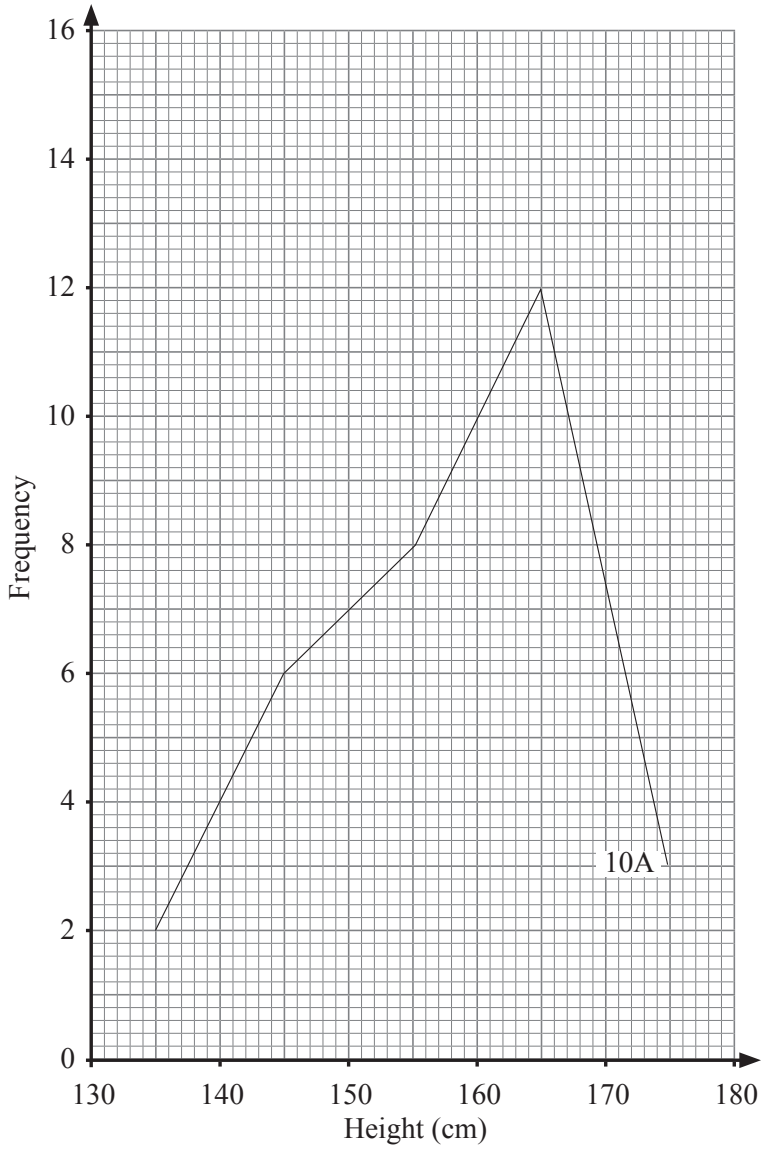
26 A solution to the equation $3x^2 + x = 67$ lies between $x = 4$ and $x = 5$
Use trial and improvement to solve this equation.
Give your answer correct to 1 decimal place.
Show all your working.

x	$3x^2 + x$	

Answer $x =$ _____ [3]

[Turn over

27 The frequency polygon below shows the heights of children in 10A.



The data below lists the heights in cm of children in 10B.

131	134	135	136	139	139	141	142	143
143	145	147	149	151	152	152	154	155
155	155	156	156	156	157	157	157	158
162	165	169	172					

On the grid above draw a frequency polygon to show the heights of the children in 10B, using the same intervals as 10A. [3]

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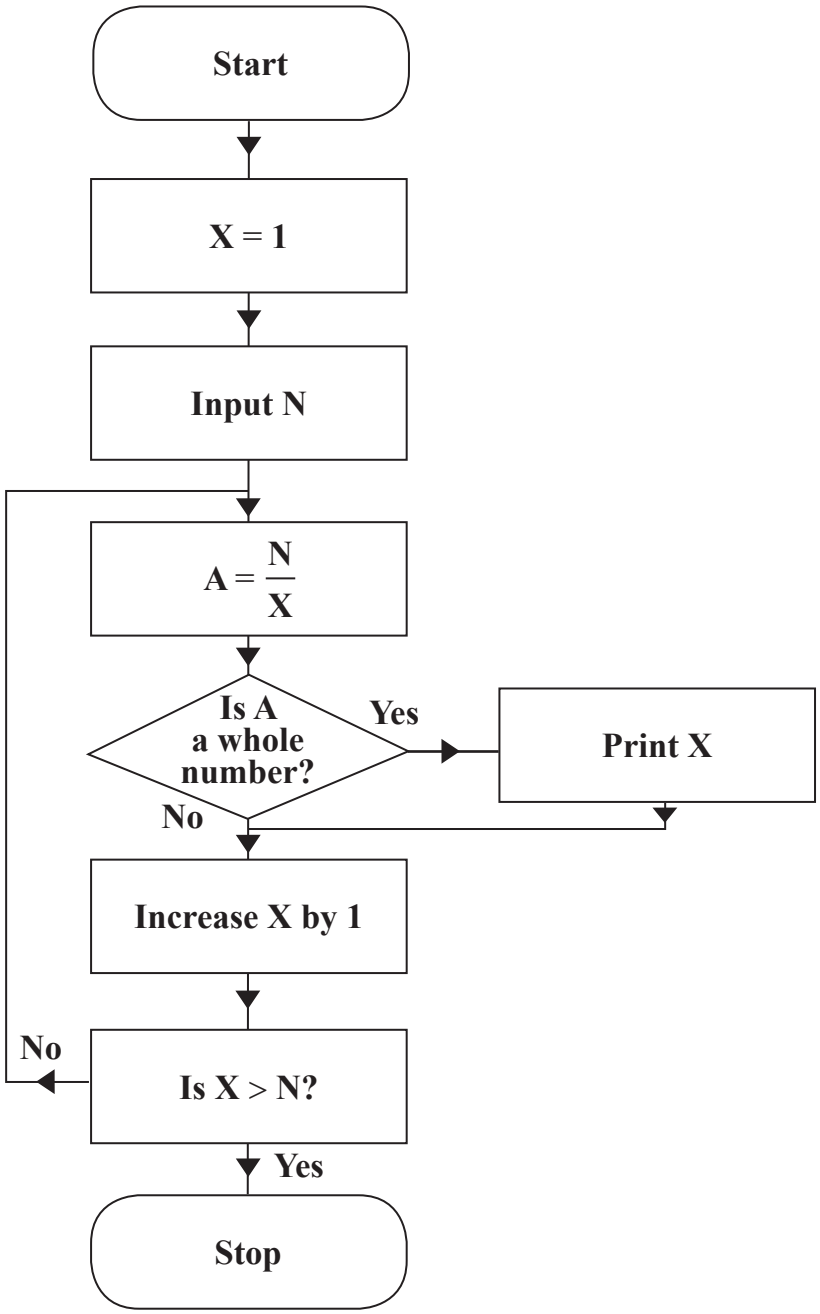
(Questions continue overleaf)

[Turn over

28 A flow chart is drawn below.



10601

The number N = 18 is entered into the flow chart.

(a) What values of X are printed out?

Answer _____ [3]

(b) Describe what the flow chart does.

_____

_____ [1]

[Turn over

Quality of written communication will be assessed in this question.

29 A shopkeeper ordered 1200 Easter eggs at a cost price of £2.40 each.
Before Easter he sold some of them, making a profit of 15% on each egg.
After Easter he had 360 eggs left, and he sold them at a reduced price.
What was the lowest price for each remaining egg to make sure he did not make a loss?

Show each step of your working clearly.

Answer £ _____ [5]

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For Examiner's use only	
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