New Specification

Rewarding Learning

Centre Number

| 71 | |
|---|---|

Candidate Number

| |
|---|

General Certificate of Secondary Education
2011

# Mathematics

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

**[GMT21]**

**TUESDAY 31 MAY**
**9.15 am–10.45 am**

GMT21

| For Examiner's use only | |
|---|---|
| Question Number | Marks |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |
| 15 | |
| 16 | |
| 17 | |
| 18 | |
| 19 | |
| 20 | |
| 21 | |
| 22 | |
| 23 | |
| 24 | |
| Total Marks | |

## TIME

1 hour 30 minutes.

## INSTRUCTIONS TO CANDIDATES

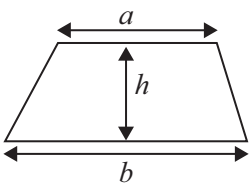
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all twenty-four** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

## INFORMATION FOR CANDIDATES

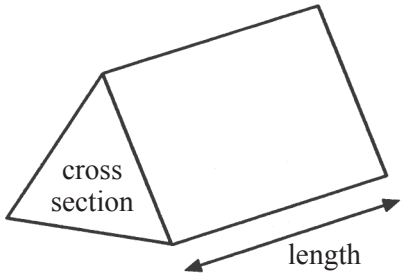
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **question 13**.
You should have a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

# Formula Sheet

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




**Volume of prism** = area of cross section × length



Answer **all** questions.

| Examiner Only | |
|---|---|
| Marks | Remark |

**1** **(a)** The stem and leaf diagram shows the weights of bags of onions.

| | |
|---|---|
| 3 | 5 7 8 9 |
| 4 | 2 5 6 8 9 9 |
| 5 | 1 3 4 |

Key 3|5 = 3.5 kg

Write down

**(i)** the range,

Answer _____ kg [1]

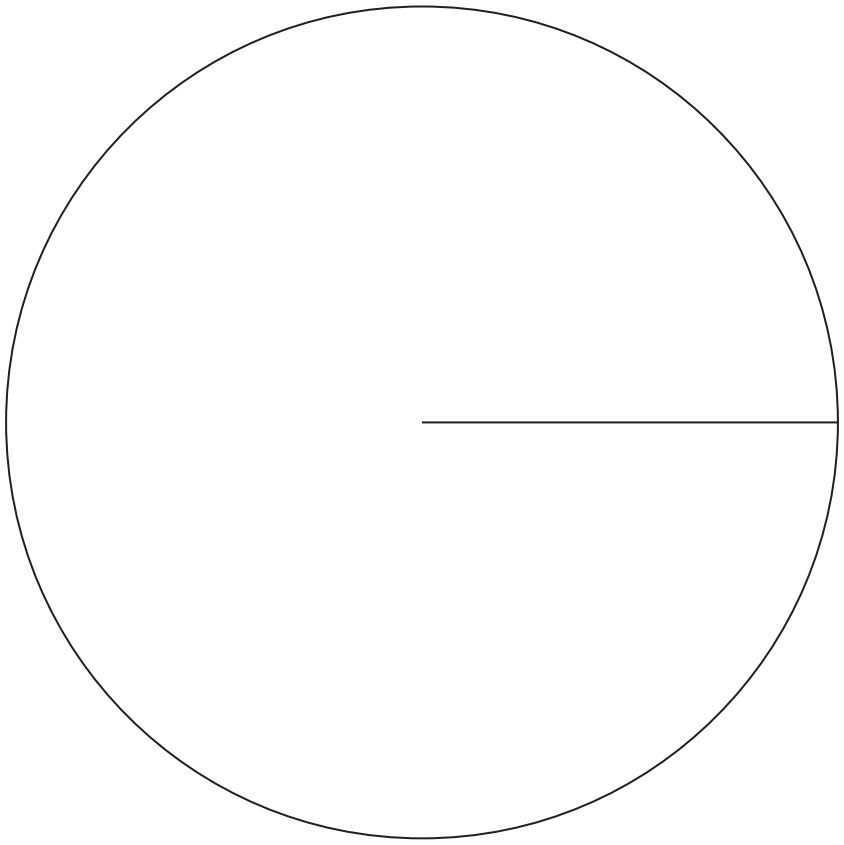
**(ii)** the median.

Answer _____ kg [1]

**(b)** The number of buns sold in a bakery was recorded as follows.

| | |
|---|---|
| Cream | 16 |
| Fruit | 10 |
| Jam | 9 |
| Chocolate | 25 |

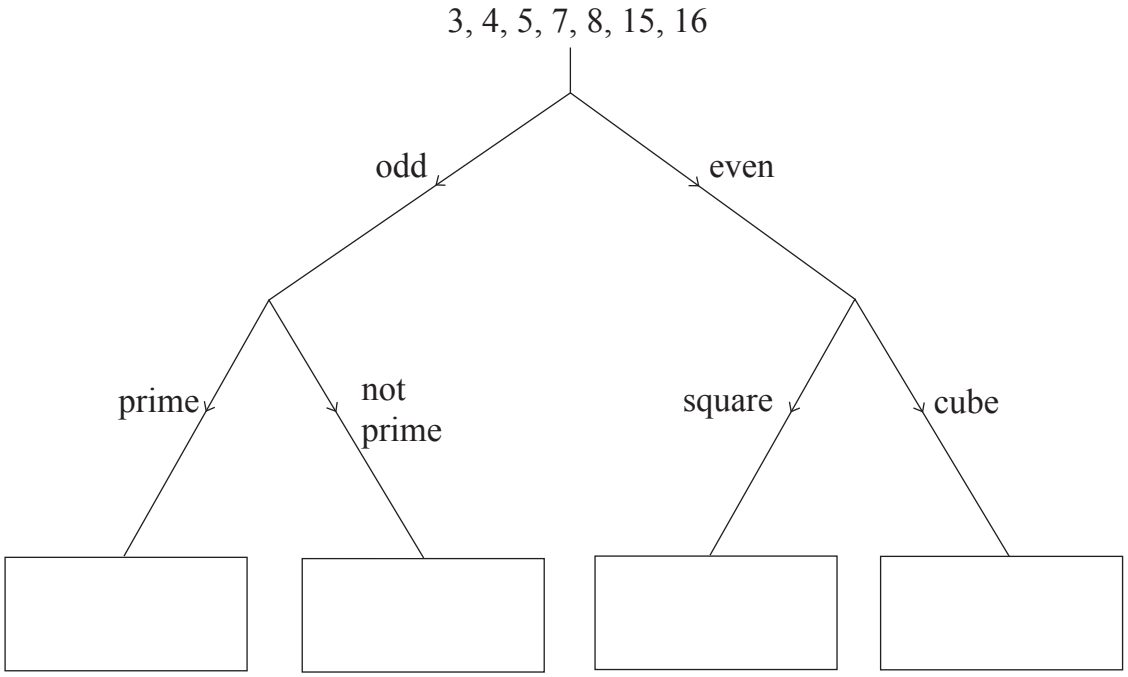
Draw a pie chart to illustrate this information.



[4]

| Examiner Only | |
|---|---|
| Marks | Remark |

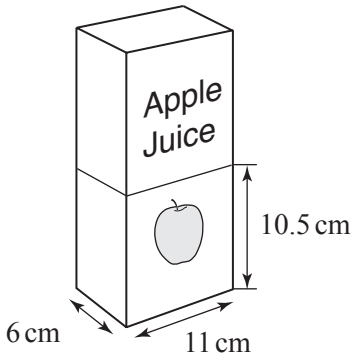
**2** Using the decision tree diagram, sort these numbers into the correct boxes.




[2]

**3** **(a)** A rectangular carton holds apple juice. The base of the carton has dimensions of 6 cm and 11 cm. The height of the juice in the carton is 10.5 cm above the base. ($1\,cm^3 = 1\,ml$)

What is the volume of juice left in the carton in millilitres?



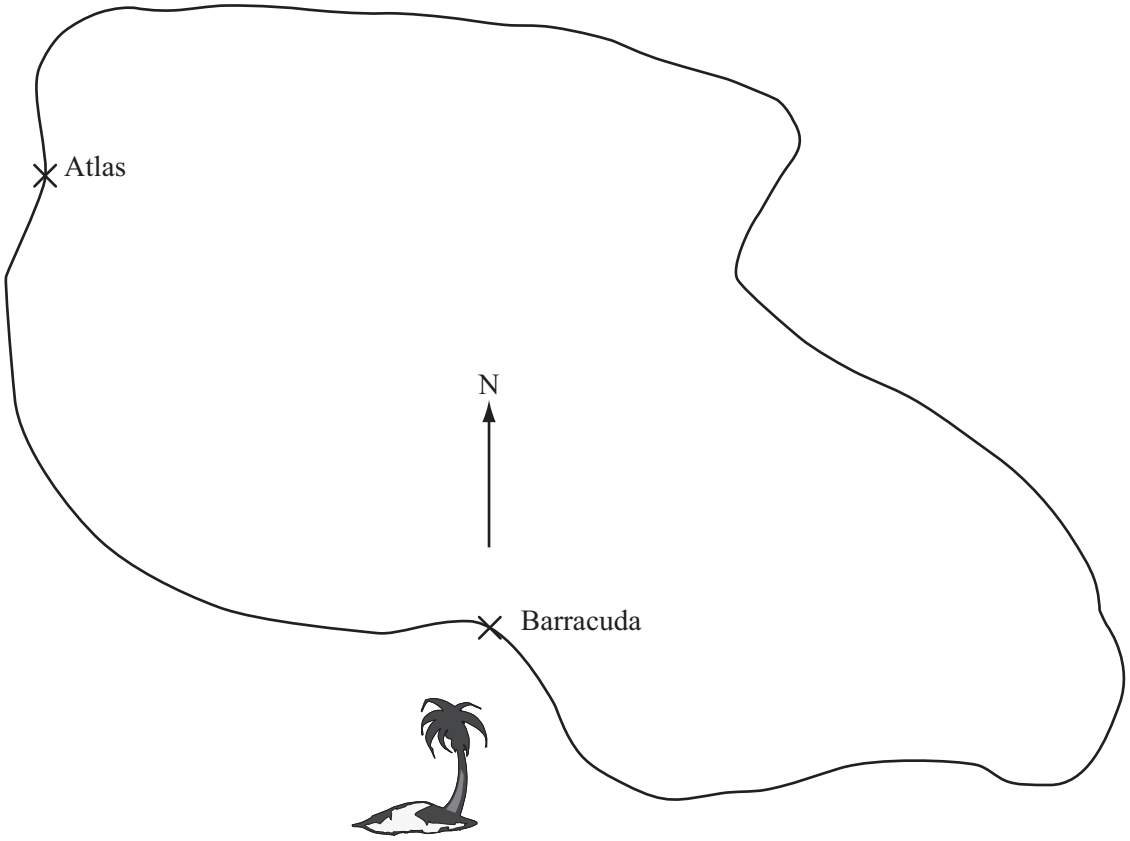

Answer _____ ml [2]

**(b)** John pours himself a glass of juice. The volume in the carton is now 412.5 ml. What is the height of the juice above the base now?

Answer _____ cm [2]

**4** An outline map of Tanua Island is shown.

The Atlas and the Barracuda are two hotels on this island.




Scale: 1 cm to 5 km

**(a)** Use the diagram to calculate the actual distance of the Atlas from the Barracuda.

Answer _____ km [2]

**(b)** A new hotel, the Capri, is being built 25 km North East of the hotel Barracuda. Mark the correct position of this new hotel. [2]

**(c)** What is the bearing of the Atlas from the Barracuda?

Answer _____° [1]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

| Examiner Only | |
|---|---|
| Marks | Remark |

**5** **(a)** Calculate

**(i)** the cube root of 64

Answer _____ [1]

**(ii)** $3.3^2 + 6^3$

Answer _____ [1]

**(iii)** $2^7$

Answer _____ [1]

**(b)** Write 23.35 correct to three significant figures.

Answer _____ [1]

**(c)** Write down a prime number between 48 and 58.

Answer _____ [1]

---

**6** Andrew earns £900 a month. He spends $\frac{1}{4}$ of this money on rent and $\frac{1}{5}$ on computer games. What fraction of the £900 has he left?

Answer _____ [4]

| Examiner Only | |
|---|---|
| Marks | Remark |

**7** Aine buys 500 g of beef mince at £8.30 per kg and 300 g of pork mince at £9.50 per kg.

Barney buys 400 g of lamb mince at £10.20 per kg and 400 g of sausage meat at £7.00 per kg.

Who pays more and by how much?

Answer _____ pays _____ more [6]

---

**8** **(a)** Solve

**(i)** $\frac{p}{6} = 3$

Answer $p =$ _____ [1]

**(ii)** $2t - 5 + t - 2 = 5$

Answer $t =$ _____ [3]

**(b)** Write down the next two numbers in the sequence

22, 20, 16, 10, ....., .....

Answer _____, _____ [2]

**(c)** Write down the first 3 terms of the sequence whose $n$th term is $n^2 + 9$

Answer _____, _____, _____ [2]

| Examiner Only | |
|---|---|
| Marks | Remark |

**9** An adult ticket for a show costs £$a$.

A child ticket costs £4 less than an adult ticket.

**(a)** Write down an expression, in terms of $a$, for the cost of a child ticket.

Answer £ _____ [1]

**(b)** Daisy buys two adult tickets and three child tickets. The total cost is £23

**(i)** Use this information to write down an **equation**, in terms of $a$.

Answer _____ [2]

**(ii)** Solve your equation to find the cost of an adult ticket.

Answer £ _____ [2]

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**10** The Ross family eat $\frac{3}{5}$ of a loaf of bread each day.

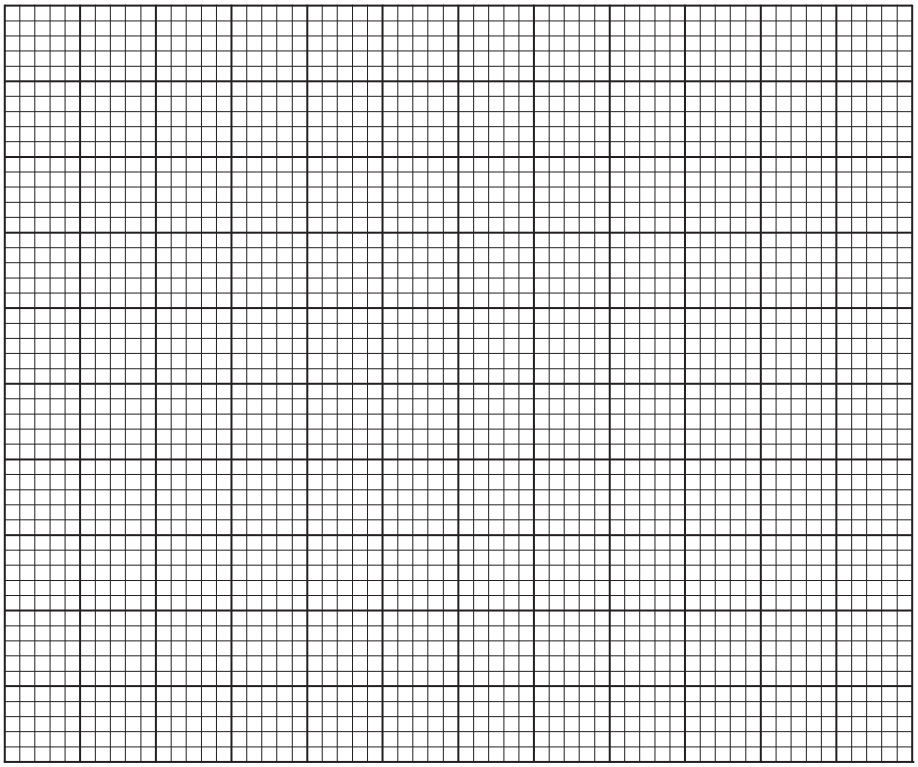
What is the least number of loaves they will need to buy for 9 days?

Answer _____ [3]

**11** The increase in test scores of 100 children over a period of time was recorded.

| Increase in test scores ($w$) | $0 < w \leq 5$ | $5 < w \leq 10$ | $10 < w \leq 15$ | $15 < w \leq 20$ | $20 < w \leq 25$ |
|---|---|---|---|---|---|
| Frequency | 16 | 36 | 22 | 14 | 12 |

**(a)** Show this information on a grouped frequency diagram. [3]



**(b)** Write down the modal class interval.

Answer _____ [1]

Examiner Only

| Marks | Remark |
|---|---|
| | |

| Examiner Only | |
|---|---|
| Marks | Remark |

**12** Lines AB, CD and EF are parallel

Angles of 96° and 60° are marked in the diagram as shown.

Calculate the size of the angles marked $x$, $y$ and $z$.

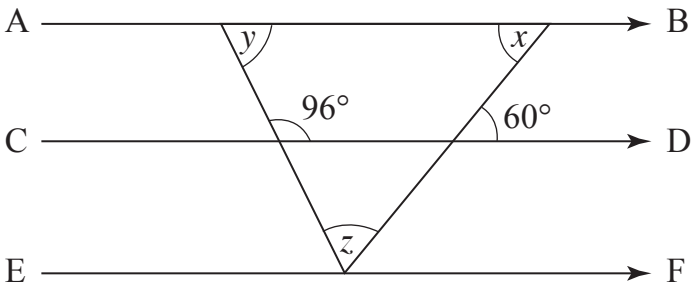



Diagram not drawn accurately

Answer Angle $x$ = _____° [1]

Angle $y$ = _____° [1]

Angle $z$ = _____° [1]

---

**Quality of written communication will be assessed in this question.**

**13 (a)**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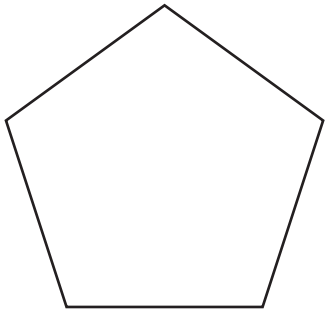
A ten pence piece has a radius of 1.4 cm.

Calculate the circumference of this coin.

Show your work clearly.

Answer _____ cm [2]

**(b)**



Explain why the sum of the interior angles in a regular pentagon is 540°.

_____

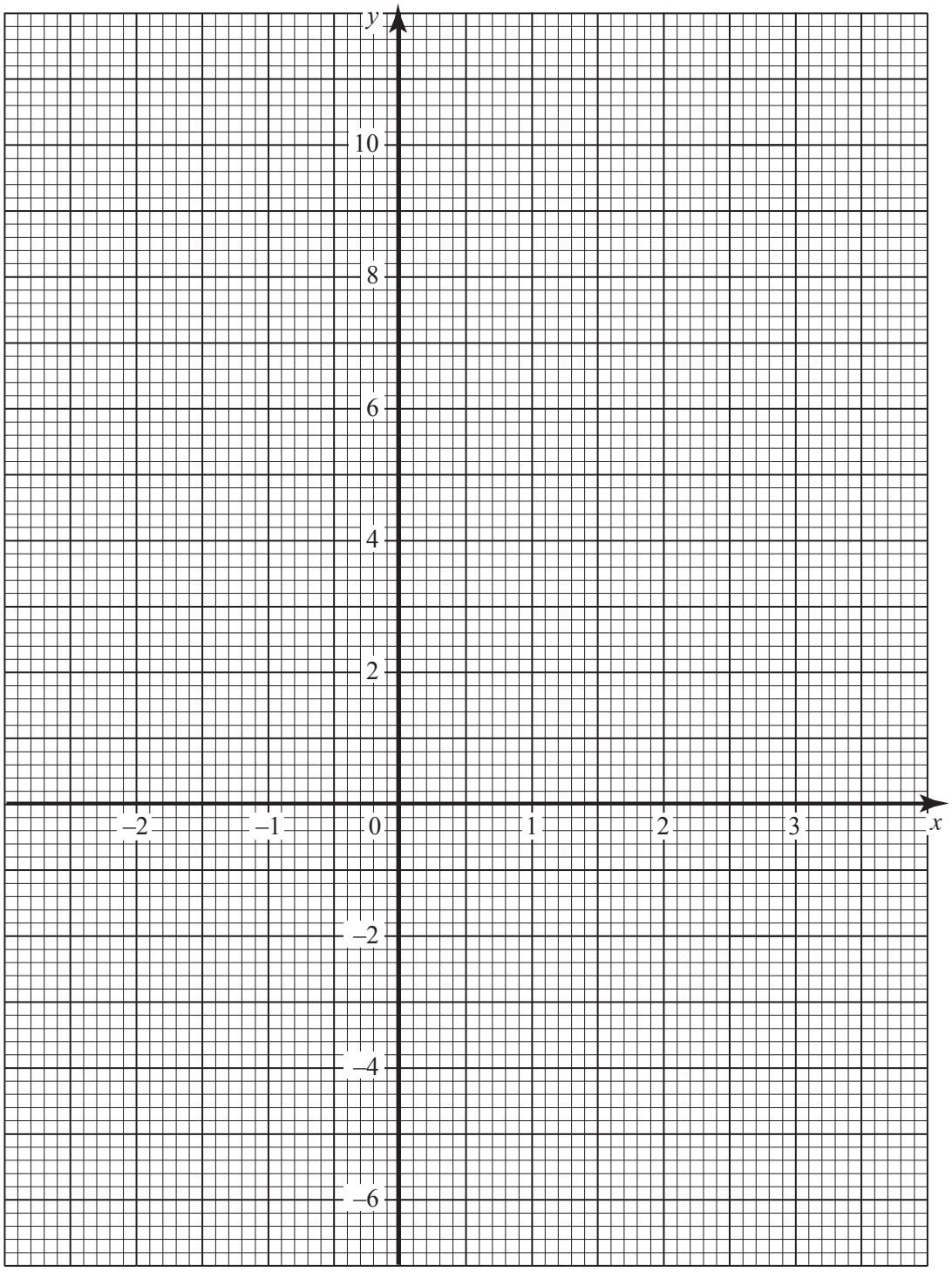
_____

_____

_____

[2]

**14** Draw the graph of $y = 4 - 3x$ on the graph paper below.




[3]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

| Examiner Only | |
|---|---|
| Marks | Remark |

**15** A new bicycle is priced at £240

In a sale it is reduced by 35%.

Calculate the sale price.

Answer £ _____ [3]

---

**16** **(a)** Write down the *n*th term for the sequence

6, 12, 18, 24, .....

Answer _____ [1]

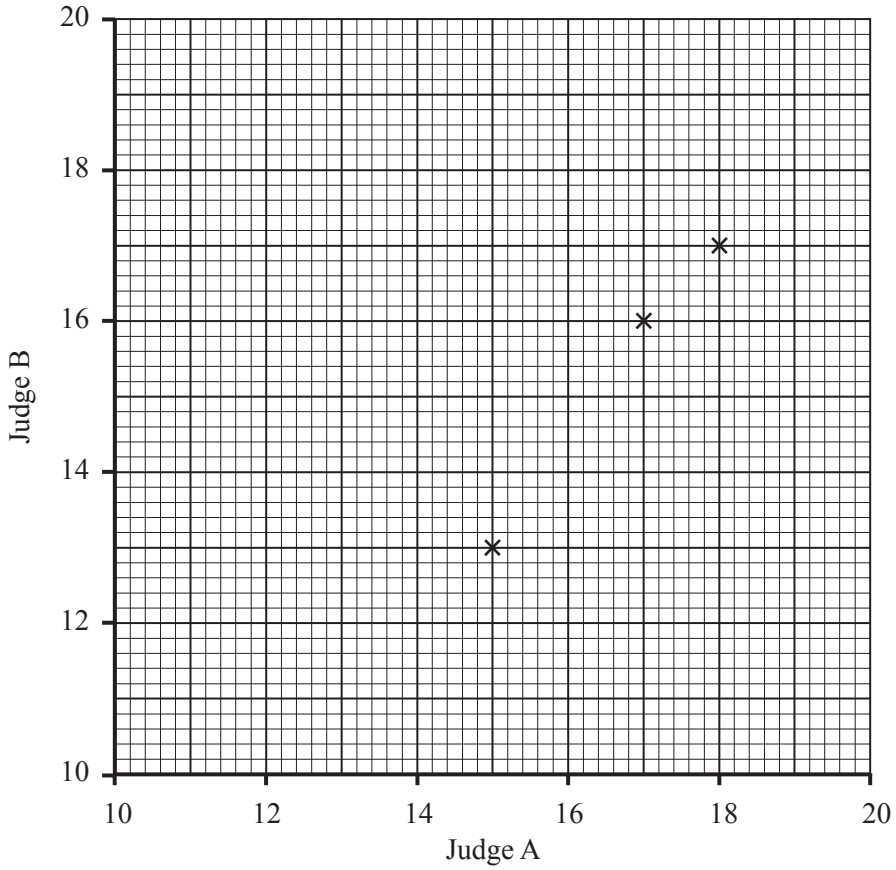
**(b)** Write down the *n*th term for the sequence

4, 9, 14, 19, .....

Answer _____ [2]

**17** The table shows the marks awarded by two judges to the first eight competitors in a gymnastics competition.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Judge A | **18** | **15** | **17** | 13 | 19 | 15 | 12 | 18 |
| Judge B | **17** | **13** | **16** | 13 | 18 | 16 | 14 | 16 |




**(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)** Another competitor was awarded 14 marks by Judge A.

Estimate the marks awarded to this competitor by Judge B.

Answer _____ [1]

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

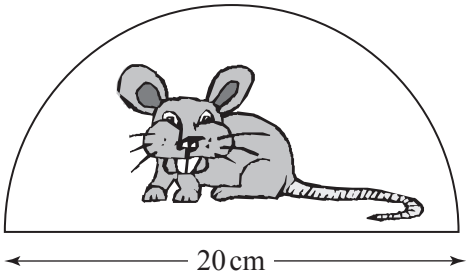
Answer _____ [1]

Examiner Only

| Marks | Remark |
|---|---|
| | |

| Examiner Only | |
|---|---|
| Marks | Remark |

**18** **(a)** A computer mouse mat is semicircular in shape. It has a diameter of 20 cm. Calculate the area of the mat.




Answer _____ $cm^2$ [2]

**(b)** Find the midpoint of the line joining the points A (−1, 6) and B (3, −2).

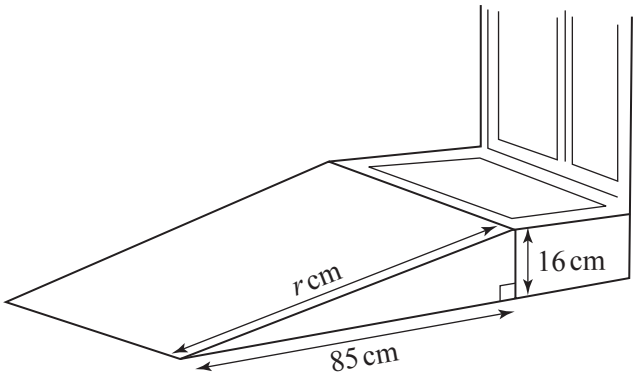
Answer (_____, _____)[2]

---

**19** A ramp is placed next to a step to allow wheelchair access.

The ramp is 16 cm high and reaches 85 cm from the step.

Calculate the sloping length, $r$ cm, of the surface of the ramp to the edge of the step.




Answer _____ cm [3]

| Examiner Only | |
|---|---|
| Marks | Remark |

**20** **(a)** At birth a baby boy weighed 4 kg. Six weeks later he weighed 7 kg.

What was the percentage increase in his weight?

Answer _____% [2]

**(b)** Colin leaves £4,800 in the bank for two years.

It earns simple interest of 3% per year.

Calculate the total amount Colin has in the bank at the end of the two years.

Answer £ _____ [2]

---

**21** **(a)** Write 84 as a product of prime factors. Express your answer in index notation.

Answer _____ [3]

**(b)** Hence find the Highest Common Factor of 84 and 8

Answer _____ [1]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**22** **(a)** One solution of $x^2 + 4x = 50$ lies between 5 and 6

Use the method of **trial and improvement** to find this solution correct to one decimal place.

**Show all your working.**

Answer $x =$ _____ [3]

**(b)** Expand and simplify

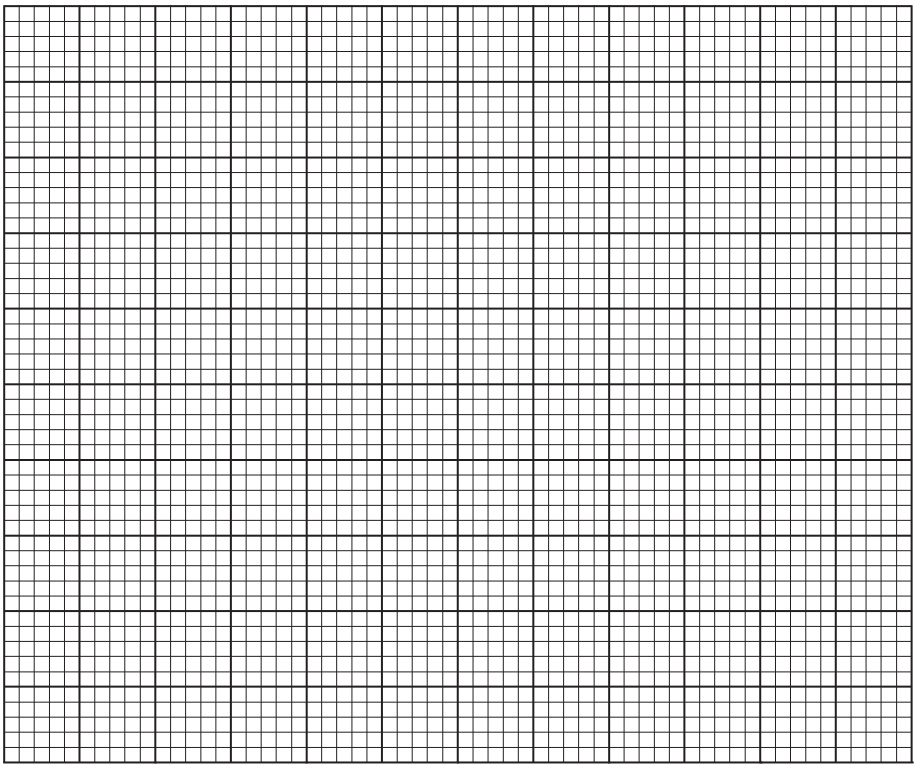
$$4(x + 3) + 3(2x - 5)$$

Answer _____ [2]

**23** The numbers of TV programmes that 100 students watched during one weekend were recorded. The numbers were grouped as shown in the table.

| Number ($n$) | Frequency |
|---|---|
| $0 < n \leq 2$ | 4 |
| $2 < n \leq 4$ | 18 |
| $4 < n \leq 6$ | 32 |
| $6 < n \leq 8$ | 20 |
| $8 < n \leq 10$ | 16 |
| $10 < n \leq 12$ | 10 |

**(a)** Show this information on a frequency polygon. [3]



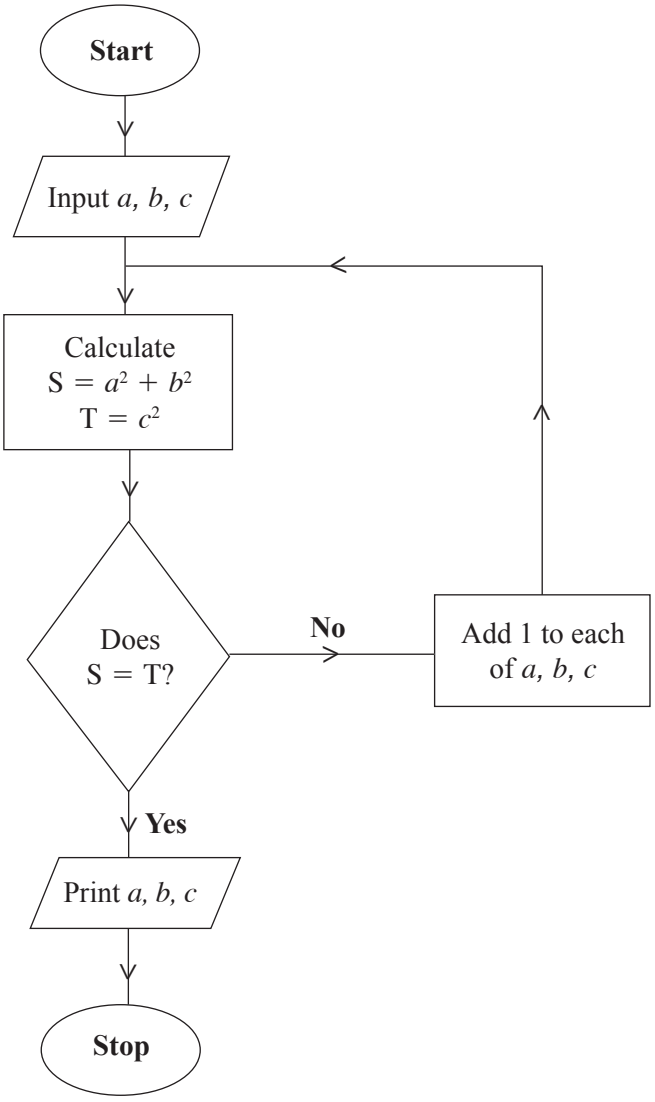
**(b)** Which class interval contains the median number?

Answer _____ [1]

Examiner Only

| Marks | Remark |
|---|---|
| | |

**24**




Starting with $a = 2$, $b = 9$, $c = 10$ use the flow chart to find the values printed.

| $a$ | $b$ | $c$ | S | T |
|---|---|---|---|---|
| 2 | 9 | 10 | | |

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

Examiner Only

| Marks | Remark |
|---|---|
| | |

THIS IS THE END OF THE QUESTION PAPER

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