Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2019

Mathematics

Unit T2
(With calculator)
Foundation Tier

[GMT21]

GMT21

TUESDAY 8 JANUARY, 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 or on blank pages.
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 Questions **16(b)** and **27(b)**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

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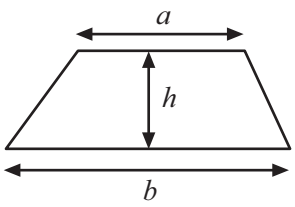
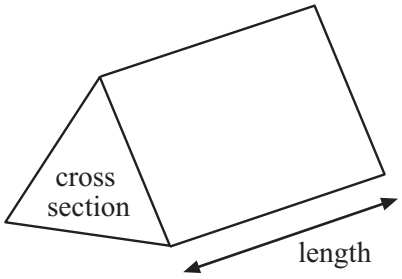
Formula Sheet

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



Volume of prism = area of cross section × length



1

3	8	9	12	17	21	25	27	30	39

Which **two** of the numbers above are

(a) square numbers, Answer _____ and _____ [1]

(b) cube numbers, Answer _____ and _____ [1]

(c) prime numbers? Answer _____ and _____ [1]

2 Write down the two missing numbers in this sequence:

39, 37, 33, 27, _____ , 9, _____ [2]

[Turn over

3 **(a)** Calculate $\frac{5}{0.4^2}$

Answer _____ [1]

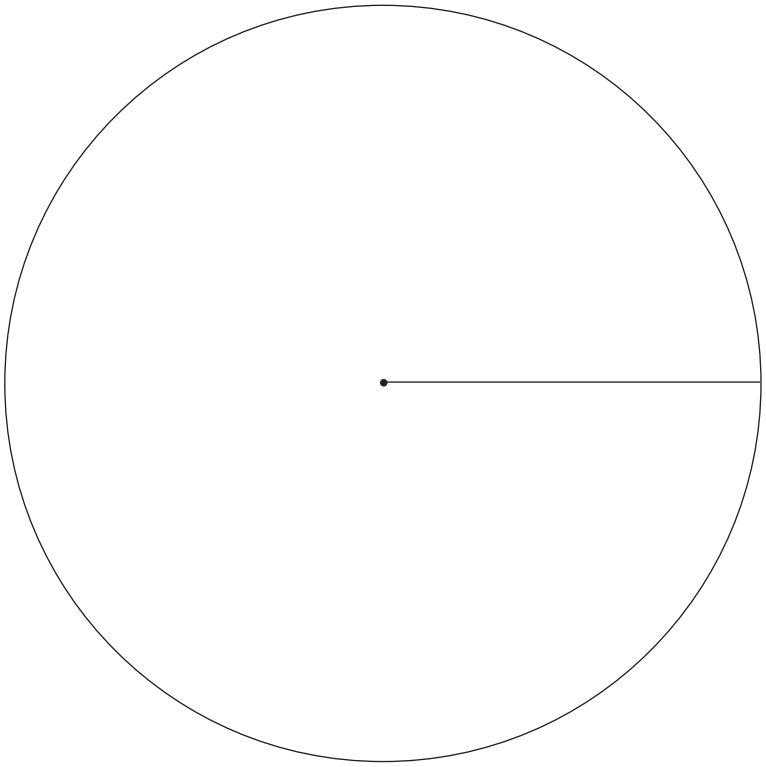
(b) Calculate $1.3^2 + \sqrt{2.56}$

Answer _____ [1]

4 Alice recorded the number of each colour of ball in a children's play area.

Colour of ball	Number	Angle
Red	46	
Green	33	
Blue	27	
Yellow	14	

Draw a clearly labelled pie chart to show this information.



[4]

[Turn over

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

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

Key 2 | 6 = 2.6 kg

Find

(a) how many of these babies weighed over 4.5 kg,

Answer _____ [1]

(b) the range,

Answer _____ kg [1]

(c) the mode,

Answer _____ kg [1]

(d) the median.

Answer _____ kg [2]

6 **(a)** Solve

(i) $\frac{x}{3} = 15$

Answer $x =$ _____ [1]

(ii) $2x - 6 = 13$

Answer $x =$ _____ [2]

(b) Factorise

(i) $6p - 18$

Answer _____ [1]

(ii) $x^2 + 5x$

Answer _____ [1]

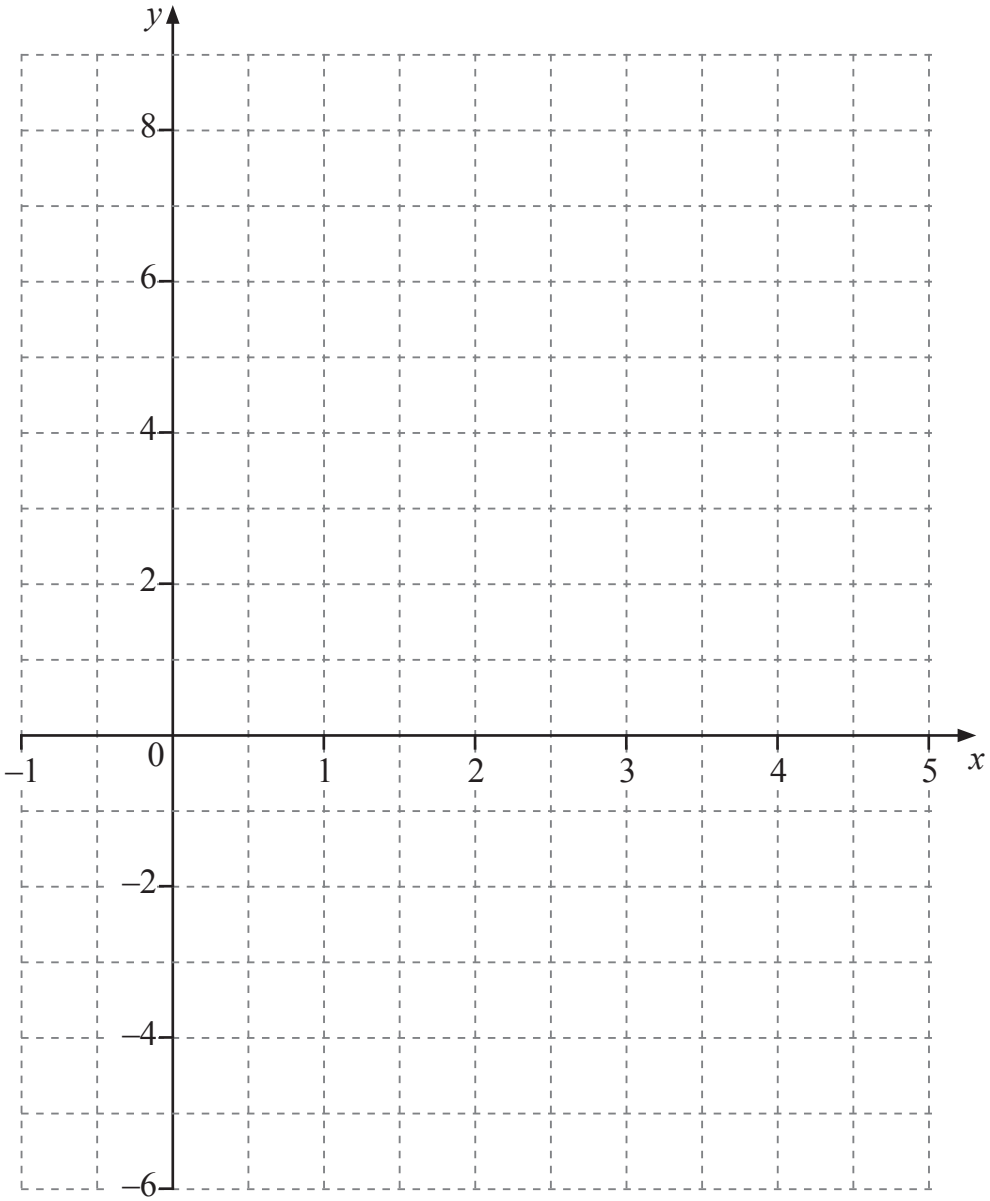
[Turn over

7 **(a)** Complete the table for $y = 8 - 3x$

x	0	1	2	3	4
$y = 8 - 3x$	8	5		−1	

[2]

(b) Using the values from the table, draw the line $y = 8 - 3x$ on the grid below.

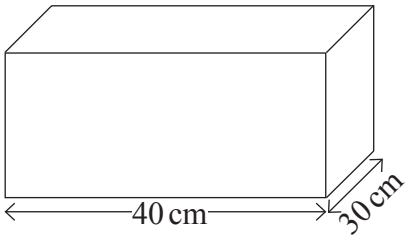


[1]

(c) Draw the line $y = 5$ on the same grid. [1]

8 **(a)** A cuboid has length 40 cm and breadth 30 cm.

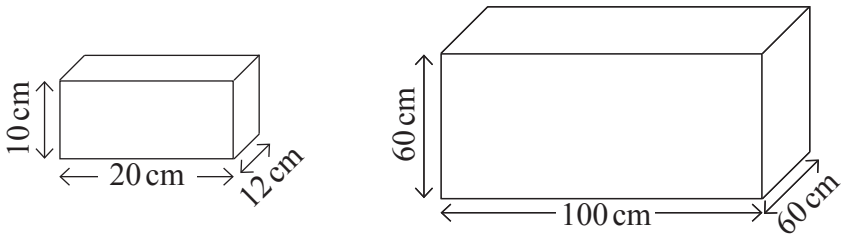
Its volume is 7 200 cm^3



Calculate the height of the cuboid.

Answer _____ [3]

(b) A child's shoebox measures 20 cm by 12 cm by 10 cm.



How many of these shoeboxes can fit into a large box measuring 100 cm by 60 cm by 60 cm?

Answer _____ [2]

[Turn over

9 Jane earns £600 a week.

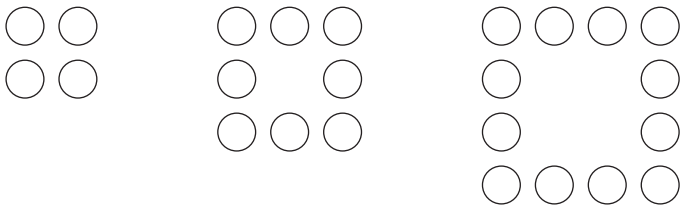
She spends $\frac{1}{5}$ of the £600 on rent.

She saves $\frac{1}{4}$ of the £600

What fraction of the £600 has she left?

Answer _____ [4]

10 Here is a sequence of patterns made with circles.



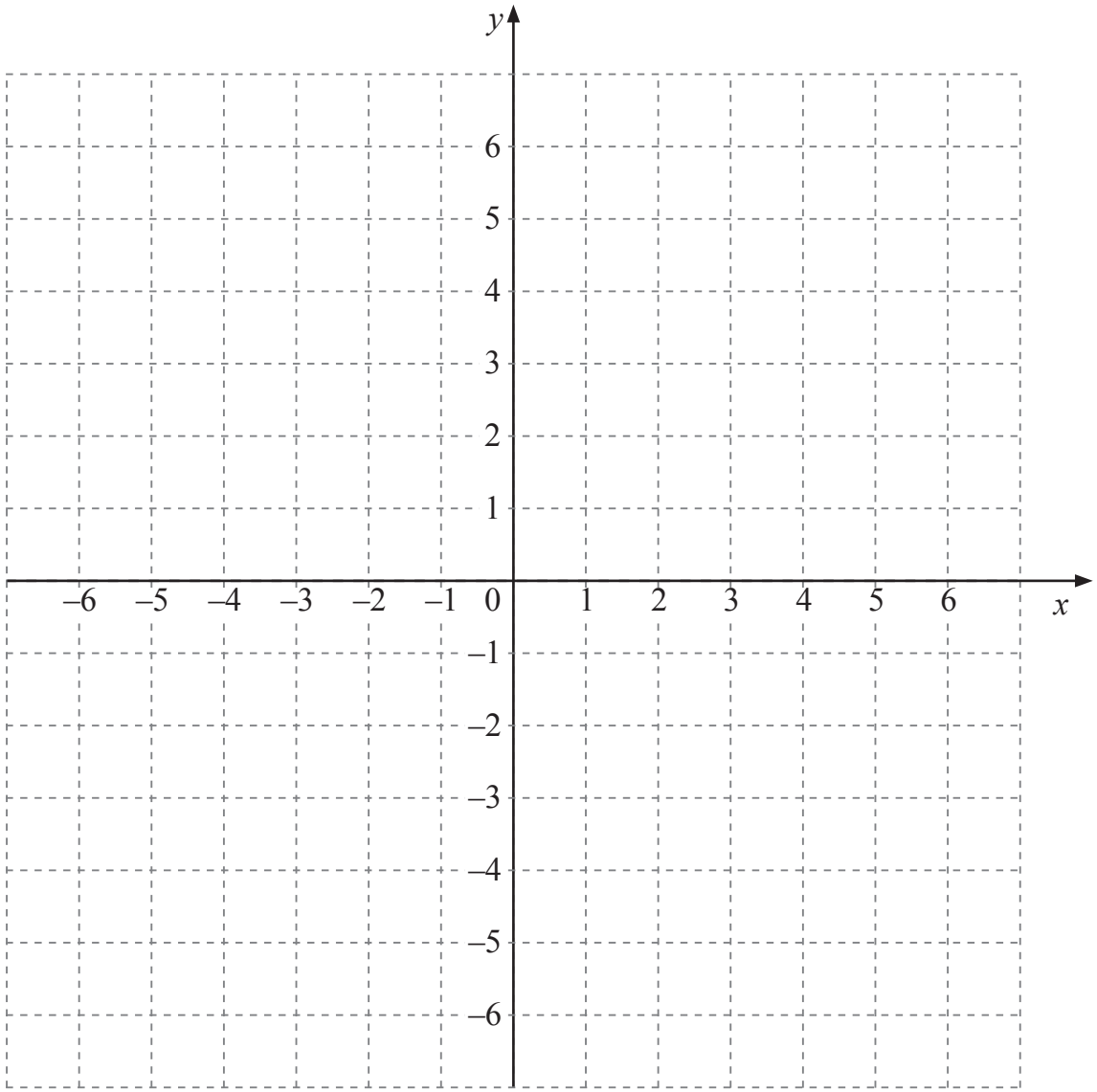
pattern 1 pattern 2 pattern 3

How many circles are needed for **pattern 5**?

Answer _____ because the rule is _____ [2]

11 P is the point (–4, 5). Q is the point (2, –1).

Write down the coordinates of the midpoint of PQ.



Answer (_____ , _____) [2]

[Turn over

12 Find the value of $5x + 3y$ when $x = 2$ and $y = -6$

Answer _____ [2]

13 Write $\frac{3}{8}$, 0.4 and 38% in ascending order of size.

Show your working.

Answer _____ , _____ , _____ [3]

14 The exchange rate between pounds and euro is £1 = €1.15

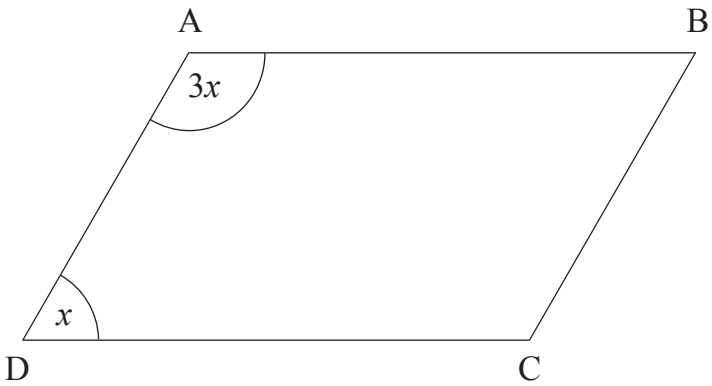
Donna buys a dress for €161

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

Answer £ _____ [2]

15 ABCD is a parallelogram.

Work out the size of angle x.



Answer x = _____ ° [2]

[Turn over

Quality of written communication will be assessed in part (b) of this question.

16 Don's Pizza sells an 8-inch circular pizza for £5 and a 12-inch circular pizza for £10

Both are the same thickness.

(a) Calculate the area of a circle with a diameter of 8 inches.

Answer _____ inches^2 [2]

(b) Which is better value for £10: two 8-inch circular pizzas or one 12-inch circular pizza?

Answer _____ [3]

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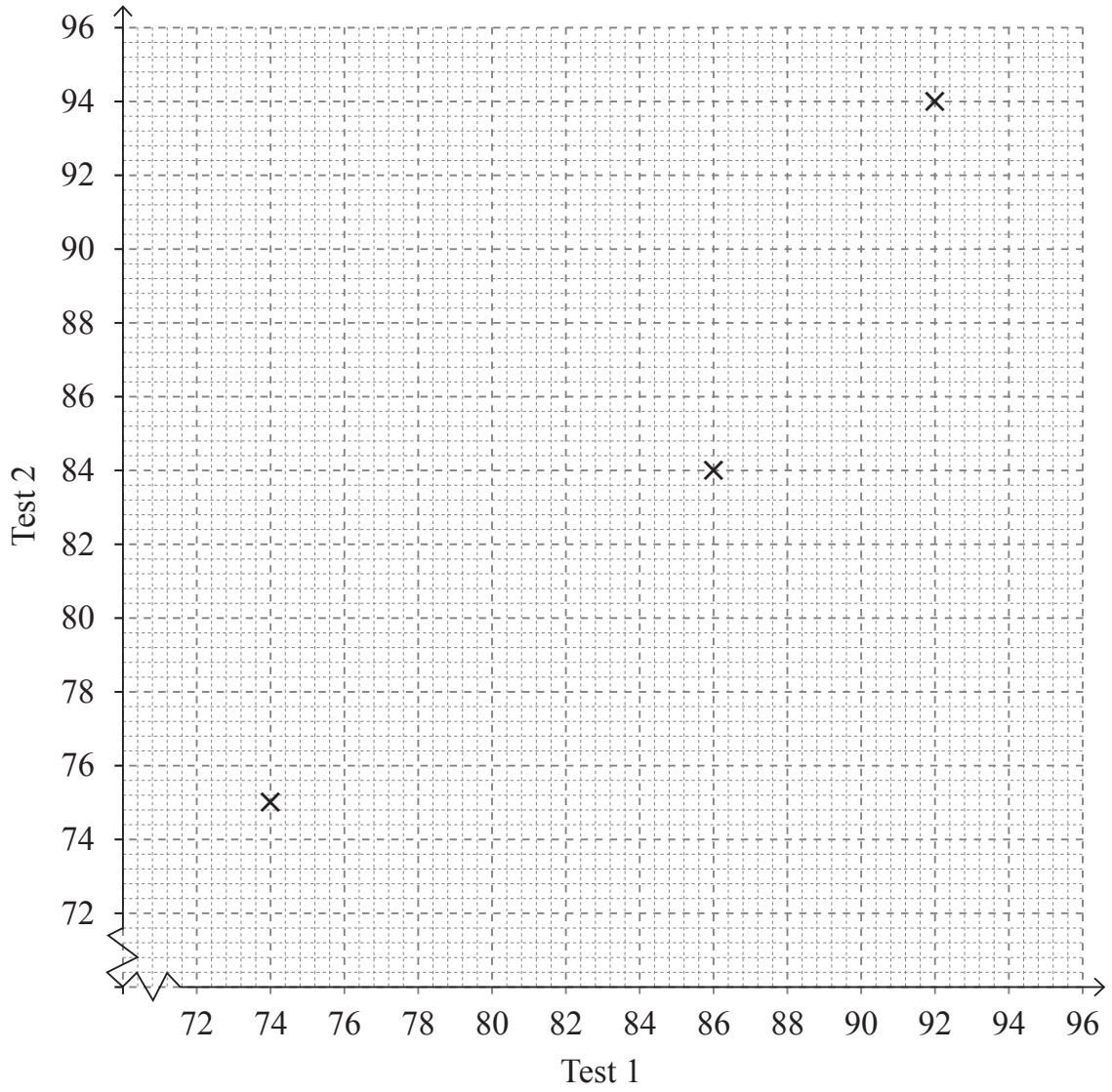
(Questions continue overleaf)

17 A teacher records the percentage test marks of eight pupils in two Maths tests.

	Amy	Brian	Clive	David	Eddie	Maurice	Noeleen	Rebekah
Test 1	**92**	**74**	**86**	88	80	90	76	82
Test 2	**94**	**75**	**84**	92	78	88	95	86



(a) Use the data to complete the scatter graph.

The first three results are already plotted. [2]

(b) The marks for one pupil were not recorded correctly.

Which pupil do you think this was?

Answer _____ [1]

(c) Draw the line of best fit, ignoring the incorrect point. [1]

(d) Sam got 84% in Test 1.

Use your line of best fit to estimate his percentage mark in Test 2.

Answer _____ % [1]

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

Answer _____ [1]

[Turn over

18 **(a)** A nonagon is a nine-sided polygon.

Work out

(i) the exterior angle of a regular nonagon,

Answer _____ ° [1]

(ii) the interior angle of a regular nonagon.

Answer _____ ° [1]

(b) The diagram shows a regular hexagon and a regular octagon placed side by side.

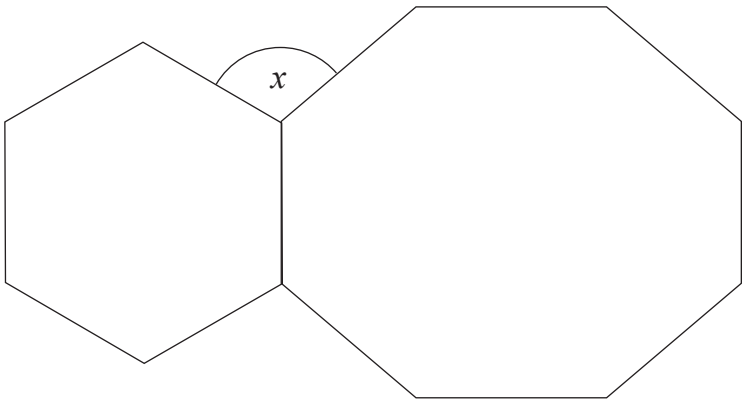


diagram not drawn accurately

Calculate the size of the angle marked x.

You must show all your working.

Answer x = _____ ° [3]

19 In a class there are 12 girls and 18 boys.

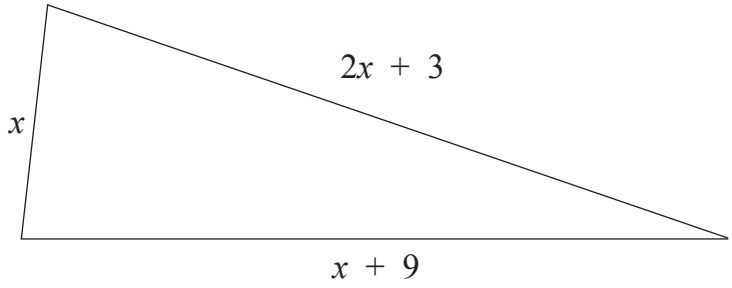
9 of the girls have blue eyes and 12 of the boys have blue eyes.

What percentage of the class have blue eyes?

Answer _____ % [2]

20 **(a)** Write an expression, in terms of x, for the perimeter of the triangle shown.

Give your answer in its simplest form.



Answer _____ [2]

(b) The perimeter of this triangle is 32

(i) Write down an equation in terms of x.

Answer _____ [1]

(ii) Solve your equation to find x.

Answer _____ [1]

21 Calculate the perimeter of the quarter circle.

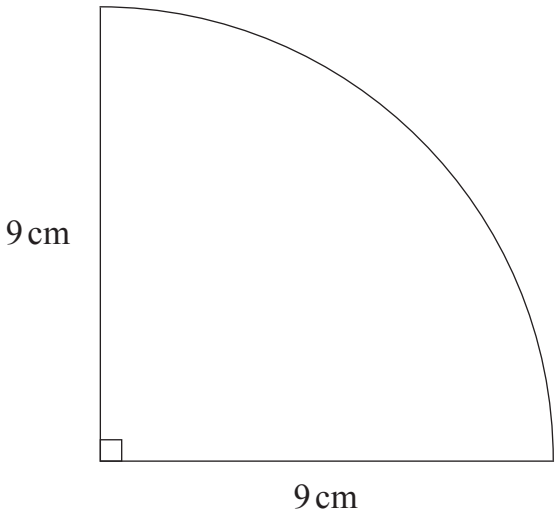


diagram not drawn accurately

Answer _____ cm [3]

[Turn over

22 **(a)** Given that $4\,500 = 2^a \times 3^2 \times 5^b$

work out the values of a and b.

Answer a = _____ b = _____ [3]

(b) Hence, write down the lowest value by which 4 500 needs to be multiplied to make a **cube** number.

Answer _____ [2]

23 Expand $p(p^2 - 4)$

Answer _____ [2]

24 ABCD is a square of side 6 cm.

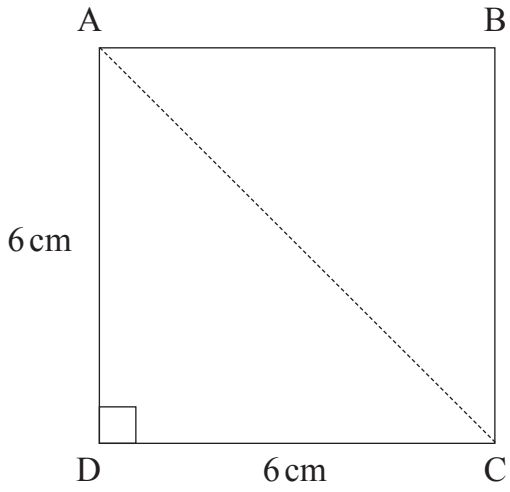


diagram not drawn accurately

How much longer is AC than AD?

You must show all your working.

Answer _____ cm [4]

[Turn over

25 The first four terms of a sequence are

$$-1, \quad 2, \quad 5, \quad 8, \quad \ldots$$

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

Answer _____ [2]

26 A solution to the equation $3x^2 - x = 50$ 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

Quality of written communication will be assessed in part (b) of this question.

27 The speeds of cars on a road were recorded.

The results are recorded in the grouped frequency table.

Speed (s miles per hour)	Frequency
$20 < s \leq 30$	12
$30 < s \leq 40$	16
$40 < s \leq 50$	18
$50 < s \leq 60$	2
$60 < s \leq 70$	2

(a) How many cars were travelling at more than 40 mph?

Answer _____ [1]

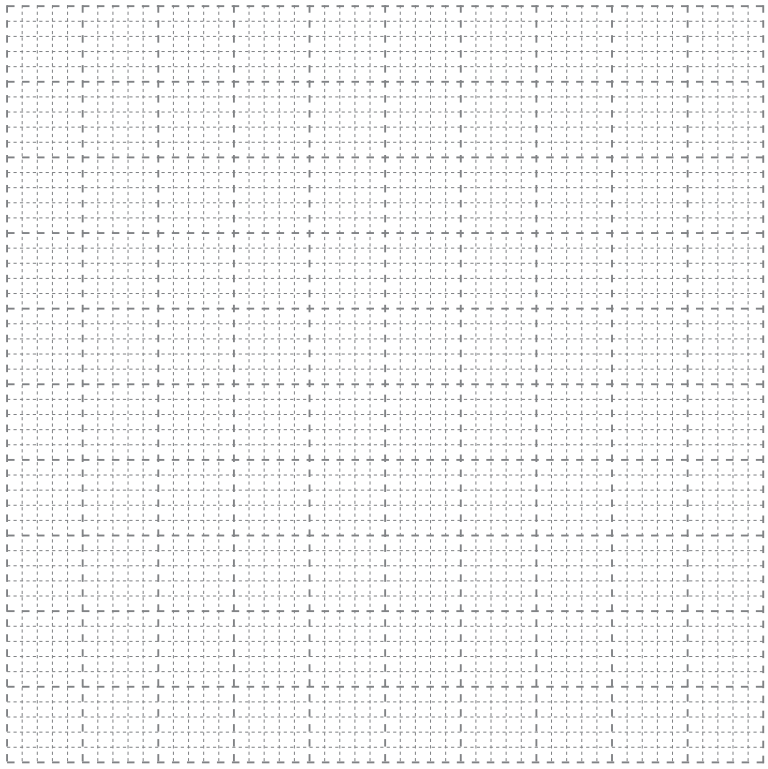
(b) Martha says the most common speed was 50 miles per hour.

Is she correct? Explain your reasoning.

Answer _____ because _____

_____ [2]

(c) On the grid below draw a frequency polygon to represent the data.



[3]

28 Show, **without using a calculator**, that

$$5\frac{1}{3} - 2\frac{5}{6} = 2\frac{1}{2}$$

[3]

29 The test scores for 10 boys in a class are

7 8 5 8 7 9 4 5 3 9

The mean test score for the 5 girls in the class is 8

Calculate the mean for this class.

Show your working clearly.

Answer _____ [3]

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