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MATHEMATICS

0580/32

Paper 3 (Core)

February/March 2023

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π , use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages.

- 1 (a) The table shows some information about the opening hours of a café.
The café opens 4 days a week.

| Day | Opening time | Closing time | Number of hours open |
|----------------------------|--------------|--------------|----------------------|
| Thursday | 8 am | 4.30 pm | |
| Friday | 8.30 am | | $7\frac{1}{2}$ |
| Saturday | 9.30 am | 5.30 pm | 8 |
| Sunday | | 3.30 pm | 5 |
| Total number of hours open | | | 29 |

Complete the table.

[3]

- (b) (i) A waiter works 29 hours a week in the café.
He is paid \$9.50 per hour.
He is paid for 52 weeks of the year.

Work out his total pay for the year.

\$ [2]

- (ii) The chef is paid 32% more than the waiter per hour.

Work out how much the chef is paid per hour.

\$ [2]

- (c) Here is part of the café's menu.

| <u>MENU</u> | | | |
|---------------|--------|----------------|--------|
| Cup of coffee | \$2.50 | Slice of pizza | \$3.70 |
| Cup of tea | \$2.30 | | |

Raj buys 2 cups of coffee, 1 cup of tea and 3 slices of pizza.

Calculate the change he receives from \$20.

\$ [3]

(d) The chef records the types of baguettes the café sells in one day.

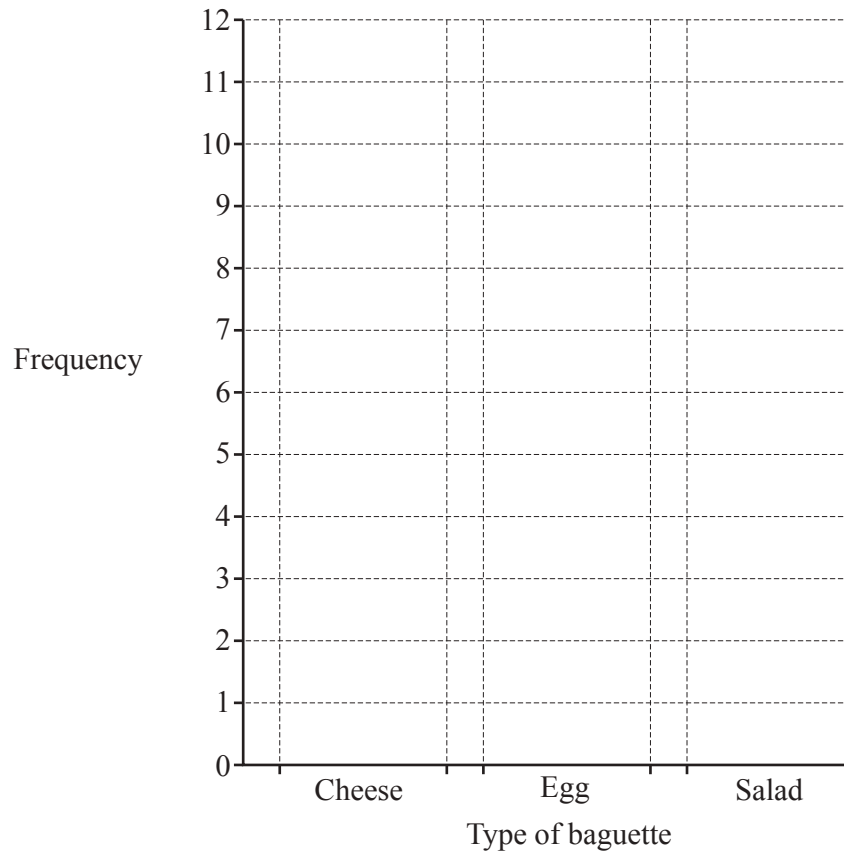
| | | | | | | | | | | |
|--------|--------|-------|-------|--------|--------|--------|-------|--------|--------|-------|
| salad | cheese | salad | salad | egg | cheese | cheese | salad | cheese | egg | salad |
| cheese | salad | salad | egg | cheese | salad | salad | egg | salad | cheese | salad |

- (i) Complete the frequency table to show this information.
You may use the tally column to help you.

| Type of baguette | Tally | Frequency |
|------------------|-------|-----------|
| Cheese | | |
| Egg | | |
| Salad | | |

[2]

- (ii) On the grid, draw a bar chart to show this information.



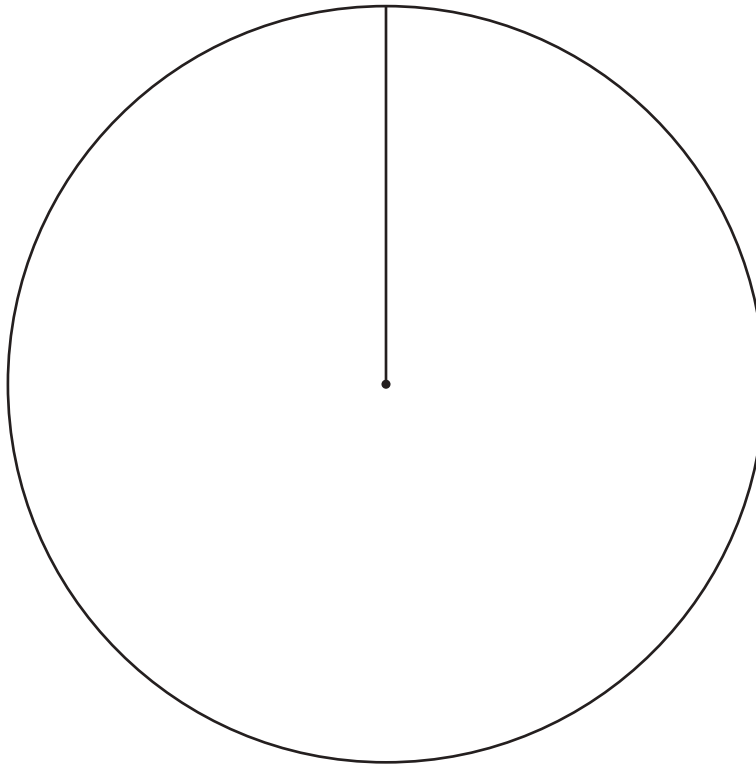
[2]

- 2 (a) Manjit asks 30 students whether they prefer joke books, puzzle books or poetry books. The results are shown in the table.

| Type of book | Number of students | Pie chart sector angle |
|--------------|--------------------|------------------------|
| Joke | 8 | |
| Puzzle | 18 | |
| Poetry | 4 | |

(i) Complete the table. [2]

(ii) Complete the pie chart. [2]



(iii) One of the students is chosen at random.

Find the probability that this student prefers puzzle books.

..... [1]

(b) The stem-and-leaf diagram shows the test scores for 24 students.

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

Key : 4 | 2 represents 42

(i) Write down the mode. [1]

(ii) 75% of the 24 students pass the test.

Work out the lowest score needed to pass the test.

..... [2]

(iii) Work out the range.

..... [1]

(iv) Frankie was absent on the day of the test.

His score is not on the stem-and-leaf diagram.

When he takes the test, his score increases the range by 3 marks.

Write down the two possible values of Frankie's score.

..... or [2]

3 (a) A recipe for making 20 biscuits uses 150 g flour, 125 g butter and 50 g sugar.

(i) Write the ratio flour : butter : sugar in its simplest form.

flour : butter : sugar = : : [2]

(ii) Work out the amount of flour, butter and sugar needed to make 50 biscuits.

flour g

butter g

sugar g [3]

(b) (i) A recipe for making one loaf of bread uses 600 g of flour.
A sack of flour contains 16 kg of flour.

Complete the statements.

One sack of flour makes a maximum of loaves of bread.

The amount of flour left over is g.

[4]

(ii) The amount of flour in a sack decreases from 16 kg to 15 kg.

Work out the percentage decrease of flour in the sack.

..... % [2]

- 4 (a) Write 6479 correct to the nearest 100.

..... [1]

- (b) Write down the multiple of 13 that is between 100 and 110.

..... [1]

- (c) Find the reciprocal of 0.6 .

..... [1]

- (d) Work out.

$$3 + 4 \times 2$$

..... [1]

- (e) Write down an irrational number with a value between 15 and 20.

..... [1]

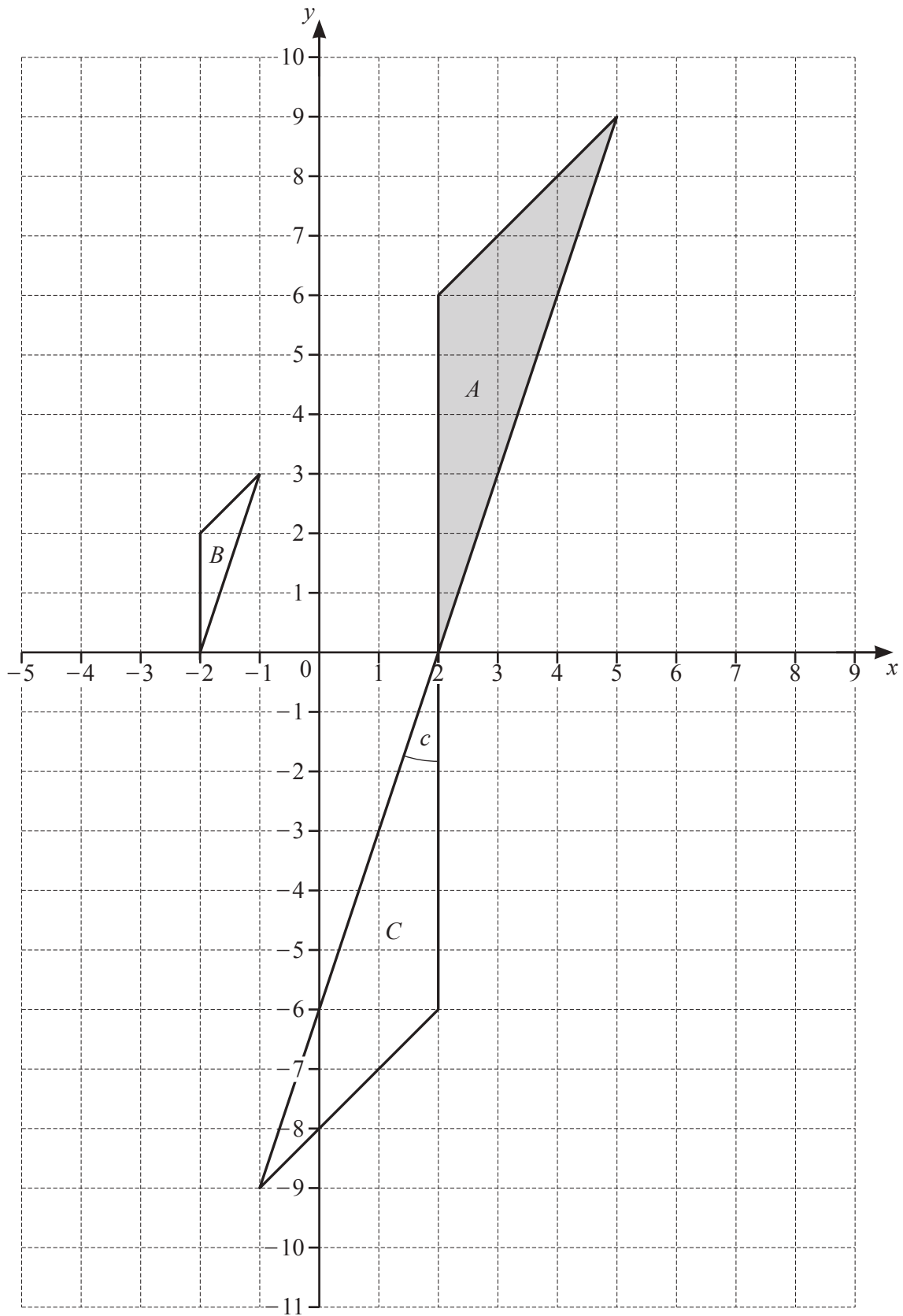
- (f) By writing each number in the calculation correct to 1 significant figure, find an estimate for the value of

$$\frac{423.8 - 78.4}{23.5}$$

You must show all your working.

..... [2]

- 5 The diagram shows three triangles, A , B and C , on a 1 cm^2 grid.



(a) Measure angle c .

Angle $c = \dots\dots\dots$ [1]

(b)

| | | |
|--------------|-------------|-----------|
| hypotenuse | equilateral | isosceles |
| acute | congruent | obtuse |
| trigonometry | cosine | reflex |

Complete these statements using two different words from the box.

(i) Angle c is [1]

(ii) Triangles A and C are [1]

(c) Work out the area of triangle A .
Give the units of your answer.

..... [3]

(d) Describe fully the **single** transformation that maps

(i) triangle A onto triangle B

..... [3]

(ii) triangle A onto triangle C .

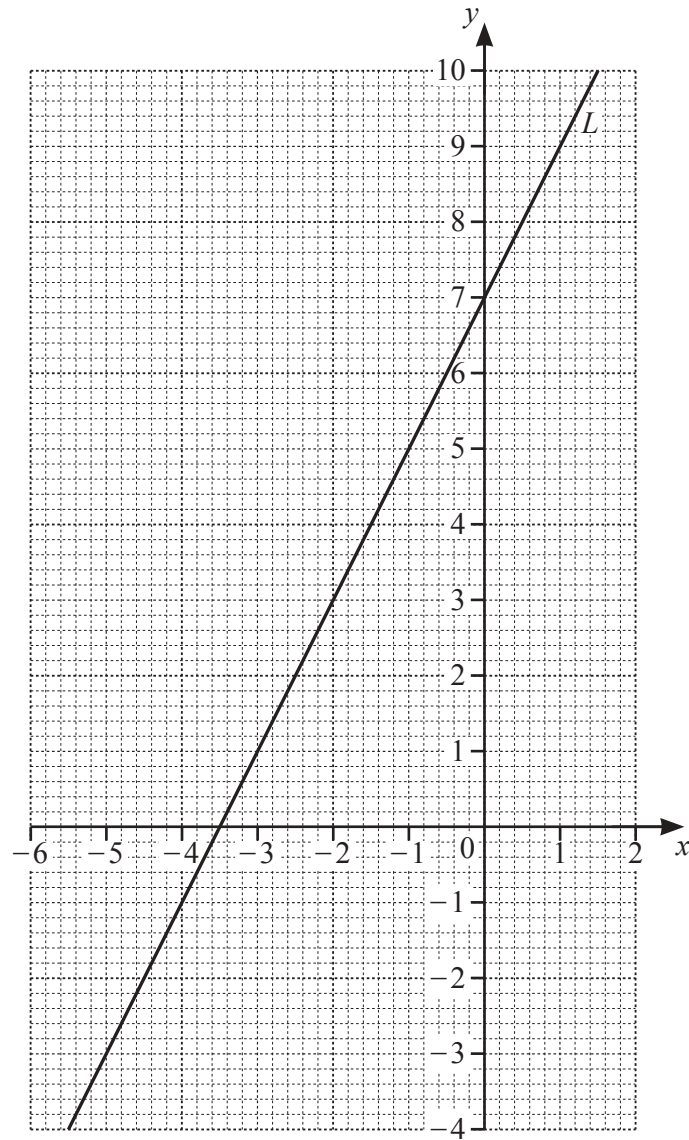
..... [3]

(e) On the grid, draw the image of

(i) triangle A after a translation by the vector $\begin{pmatrix} 3 \\ -10 \end{pmatrix}$ [2]

(ii) triangle A after a reflection in the line $x = 4$. [2]

6



(a) Find the equation of line L in the form $y = mx + c$.

$y = \dots\dots\dots$ [2]

(b) Write down the coordinates of the point where line L crosses the x -axis.

(..... ,) [1]

(c) (i) Complete the table of values for $y = x^2 + 5x + 3$.

| | | | | | | | | |
|-----|----|----|----|----|----|----|---|---|
| x | -6 | -5 | -4 | -3 | -2 | -1 | 0 | 1 |
| y | 9 | | -1 | | | -1 | | |

[3]

(ii) On the grid, draw the graph of $y = x^2 + 5x + 3$ for $-6 \leq x \leq 1$.

[4]

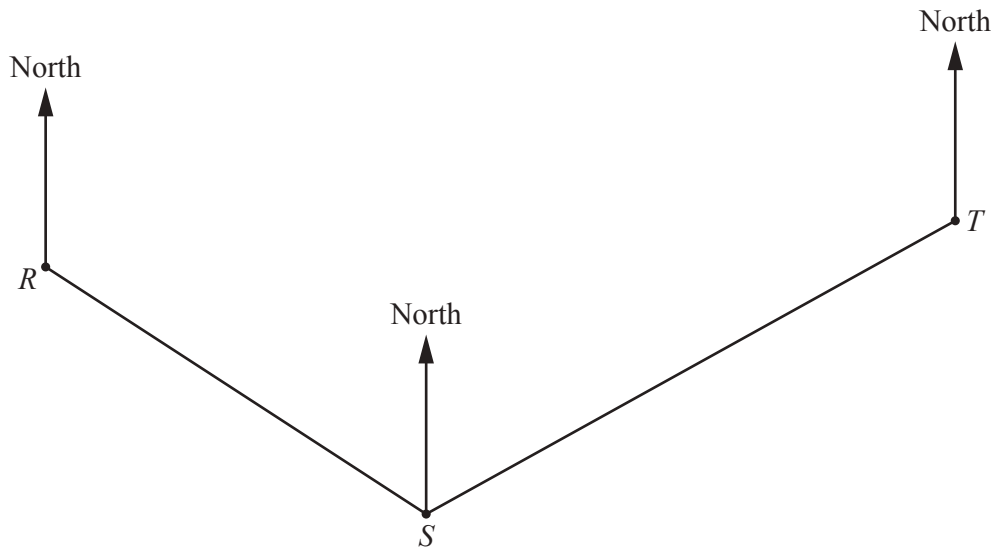
(d) (i) On the grid, draw the line $y = 6$.

[1]

(ii) Use your graphs to solve the equation $x^2 + 5x + 3 = 6$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

- 7 The scale drawing shows the positions of three towns, R , S and T , on a map. RS and ST are straight roads between the towns. The scale is 1 centimetre represents 8 kilometres.



Scale: 1 cm to 8 km

- (a) Work out the actual distance between R and S .

..... km [2]

- (b) Another town, V , is on a bearing of 163° from R and on a bearing of 215° from T .

Mark the position of V on the map. [2]

- (c) A man cycles at a constant speed of 24 km/h along the straight road from S to T .
After 1 hour and 50 minutes he stops at a café, C .

Mark the position of C on the map.
You must show all your working.

[3]

- (d) A hotel, H , is on a bearing of 321° from R .

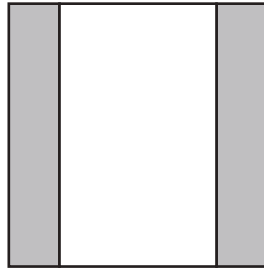
Work out the bearing of R from H .

..... [2]

- (e) Write the scale $1 \text{ cm to } 8 \text{ km}$ in the form $1 : n$.

1 : [1]

8 (a)



(i) Write down the order of rotational symmetry of the diagram.

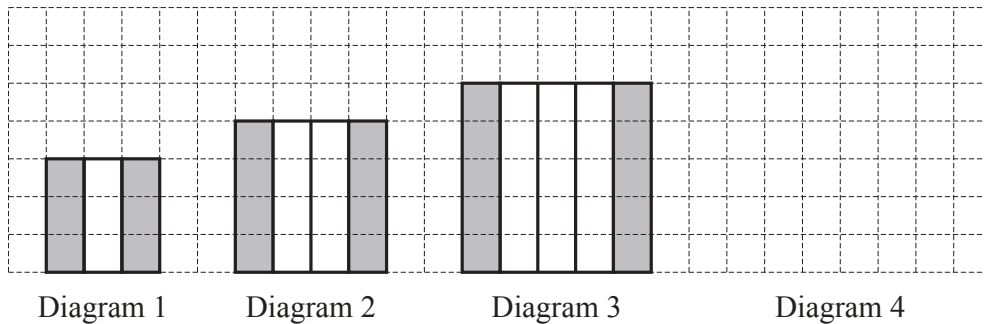
..... [1]

(ii) On the diagram, draw all the lines of symmetry.

[2]

(b) The grid shows the first three diagrams in a sequence.

Each diagram is made using small grey and small white squares to make grey and white columns.



(i) On the grid, draw Diagram 4.

[1]

(ii) (a) Complete this statement.

Diagram n has grey columns.

[1]

(b) Find an expression, in terms of n , for the total number of columns in Diagram n .

..... [2]

(c) Find an expression, in terms of n , for the fraction of columns that are grey in Diagram n .

..... [1]

(iii)

| | | | | | |
|-------------------------|---|----|----|---|---|
| Diagram number | 1 | 2 | 3 | 4 | 5 |
| Number of grey squares | 6 | 8 | 10 | | |
| Number of white squares | 3 | 8 | 15 | | |
| Total number of squares | 9 | 16 | 25 | | |

(a) Complete the table. [3]

(b) Write an expression, in terms of n , for the number of grey squares in Diagram n .

..... [2]

(c) The number of white squares in Diagram n is $n(n+2)$.

Work out the number of white squares in Diagram 30.

..... [2]

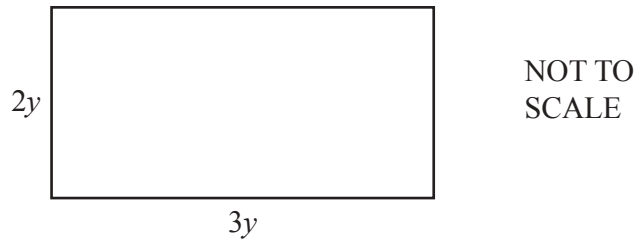
(d) Diagram k has a **total** of 1296 squares.

Work out the value of k .

$k =$ [2]

Question 9 is printed on the next page.

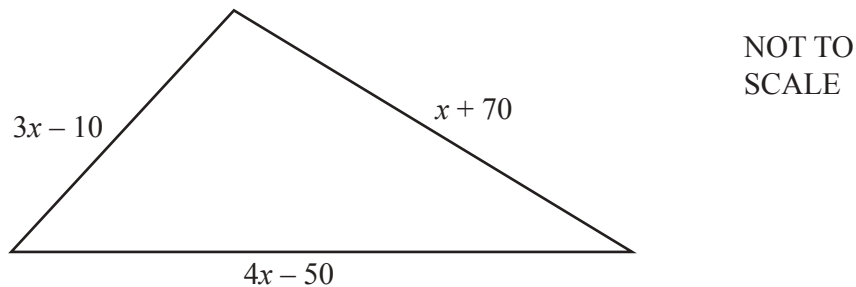
9 (a)



Write down an expression for the area of this rectangle.
Give your answer in its simplest form.

..... [2]

(b) In this part, all measurements are in centimetres.



The perimeter of the triangle is 526 cm.

Find the value of x .

$x =$ [3]

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