Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0980/32**

Paper 3 (Core) **May/June 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 **20** pages. Any blank pages are indicated.

1 **(a)** Write the number three hundred thousand and three in figures.

..... [1]

(b) Write 15 896 correct to

(i) the nearest thousand

..... [1]

(ii) the nearest ten.

..... [1]

(c) By writing each number in the calculation correct to 1 significant figure, work out an estimate for the value of

$$\frac{28.9 \times 5.49}{0.472 + 0.97}.$$

You must show all your working.

..... [2]

(d) Find the value of

(i) $\sqrt{1849}$

..... [1]

(ii) $5^0 - 5^{-1}$

..... [1]

(iii) $\dfrac{5 \sin 30 - 8}{11}$.

..... [1]

(e) A cyclist travels at a constant speed of 8.5 metres per second.

(i) Work out how long the cyclist takes to travel a distance of 5.27 kilometres.
Give your answer in minutes and seconds.

..... min ..... s [4]

(ii) The cyclist increases speed from 8.5 m/s to 10.2 m/s.

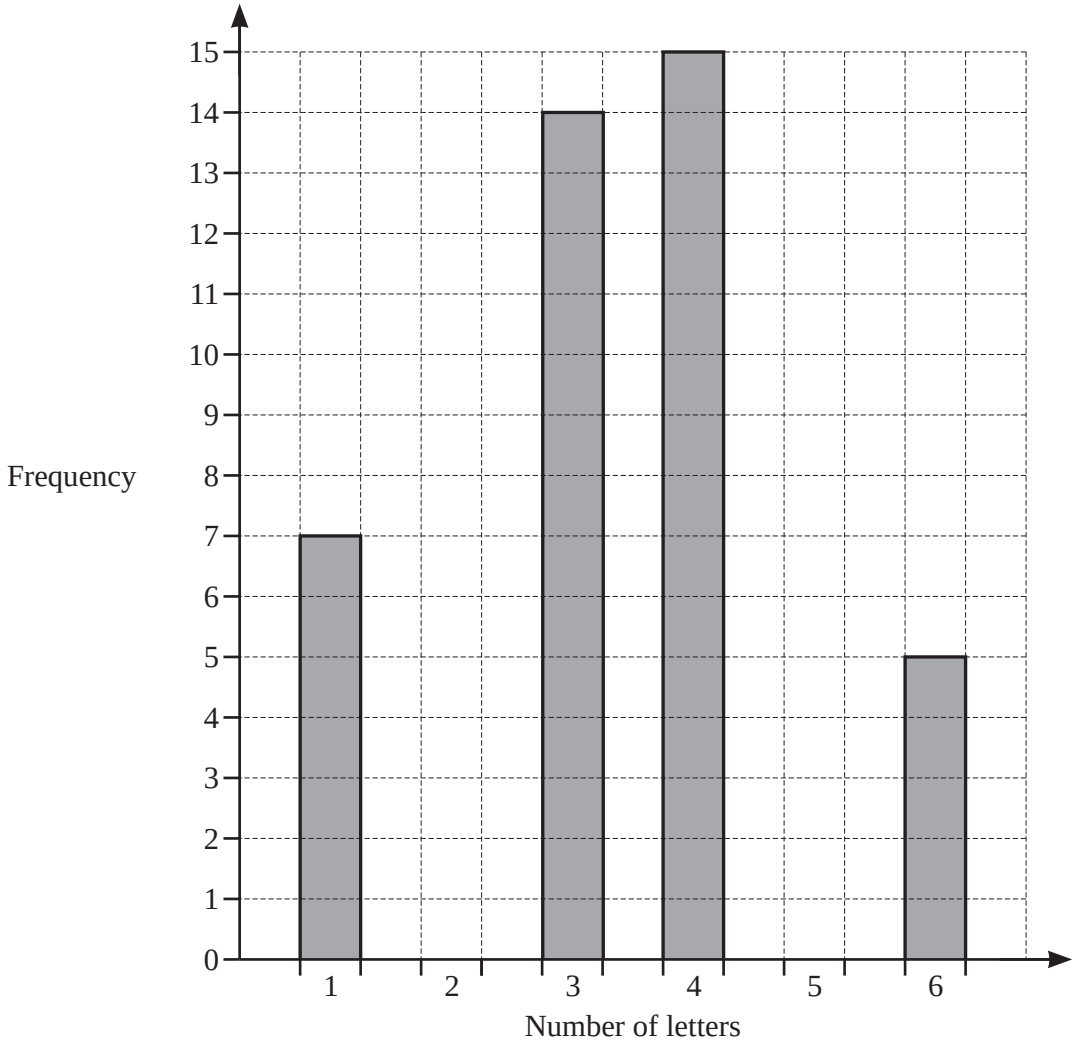
Work out the percentage increase in speed.

..... % [2]

[Turn over

2 **(a)** Mika counts the number of letters in each of the 61 words in a paragraph.
Some of his results are shown in the table and bar chart.

Number of letters	1	2	3	4	5	6
Frequency	7	12		15		5



(i) Complete the table and the bar chart. [3]

(ii) Write down the mode.

..... [1]

(b) Grace also counts the number of letters in each word of another paragraph.
Her results are shown in the table.

Number of letters	1	2	3	4	5	6
Frequency	10	18	9	6	5	2

(i) Work out the mean.

..... [3]

(ii) She picks one of these words at random.

Find the probability that it has more than three letters.

..... [2]

(c) She counts the number of letters in each word in the next sentence.
These are her results.

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

(i) Find the median.

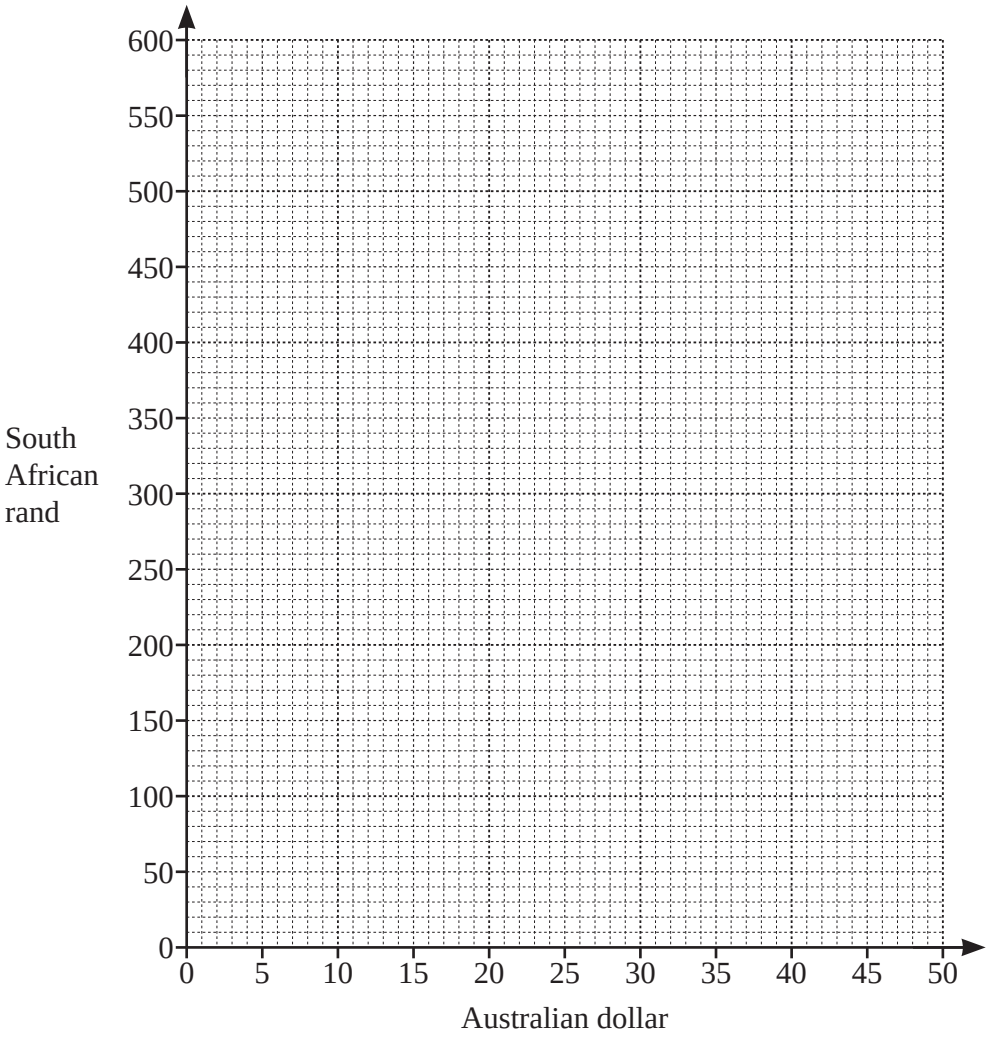
..... [2]

(ii) Find the range.

..... [1]

3 (a)

50 Australian dollars = 540 South African rands



(i) On the grid, draw a conversion graph between Australian dollars and South African rands. [2]

(ii) A watch costs 1350 South African rands.

Find the cost of this watch in Australian dollars.

..... Australian dollars [2]

(b) (i) A plane leaves Sydney at 21 48 local time to fly to Johannesburg.
The flight takes 14 hours 15 minutes.
The local time in Sydney is 8 hours ahead of the local time in Johannesburg.

Find the local time in Johannesburg when the plane arrives.

..... [3]

(ii) On the plane there are 315 people.
The ratio of children : adults = 7 : 8.

Work out the number of adults on the plane.

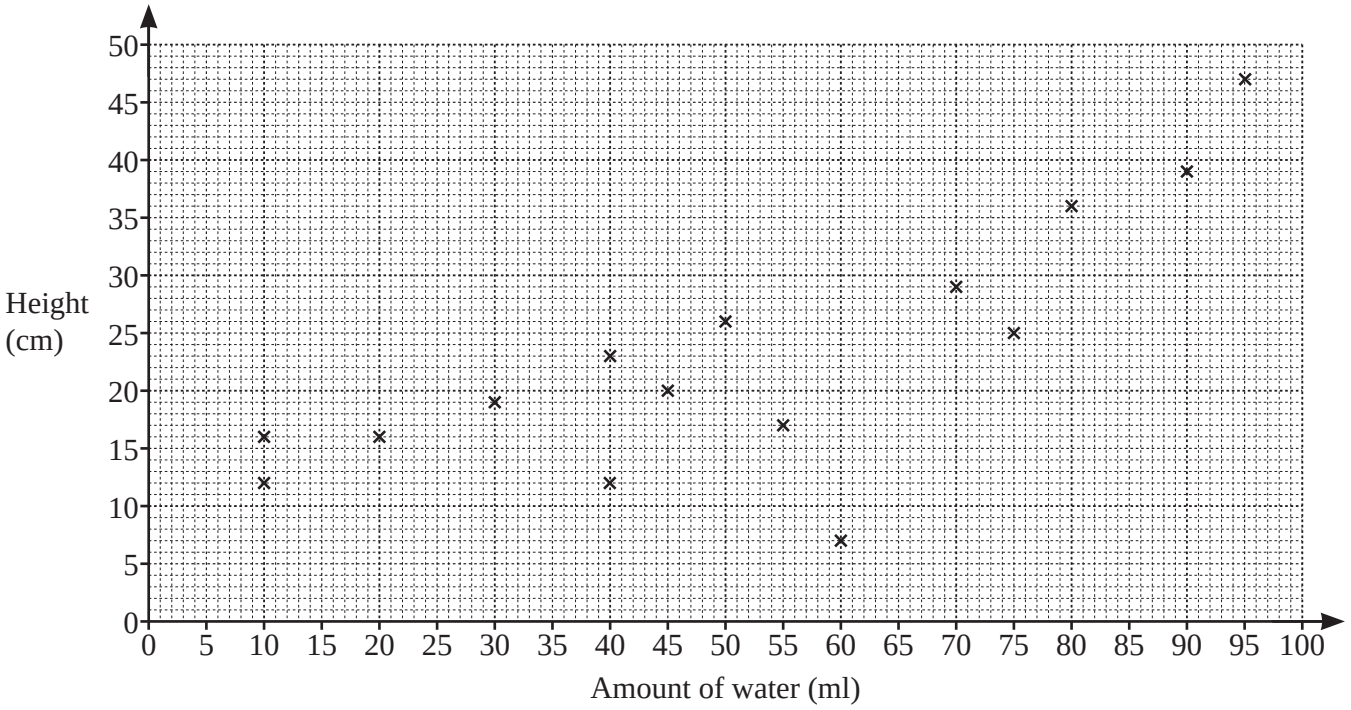
..... [2]

(iii) Another plane has 420 seats.
90% of the seats are occupied.

Work out the number of seats that are occupied.

..... [2]

4 Fidel gives different amounts of water to some plants.
The scatter diagram shows the height (cm) and the amount of water (ml) for each of 15 plants.



(a) Plot these two results on the scatter diagram.

Amount of water (ml)	60	85
Height (cm)	27	41

[1]

(b) What type of correlation is shown in the scatter diagram?

..... [1]

(c) One of the plants had a lower height than expected for the amount of water given.

On the scatter diagram, put a ring around the point for this plant. [1]

(d) (i) On the scatter diagram, draw a line of best fit. [1]

(ii) Another plant is given 65 ml of water.

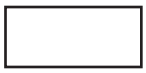
Use your line of best fit to estimate the height of this plant.

..... cm [1]

(e) Find the percentage of these 17 plants that have a height of more than 24 cm.
Give your answer correct to 1 decimal place.

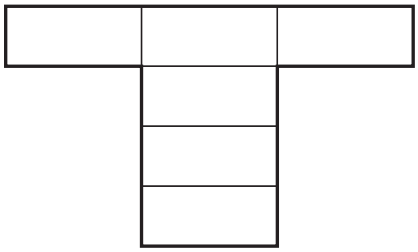
..... % [3]

5 (a)



NOT TO SCALE

This rectangle has an area of $12\,cm^2$ and a perimeter of 16 cm.



NOT TO SCALE

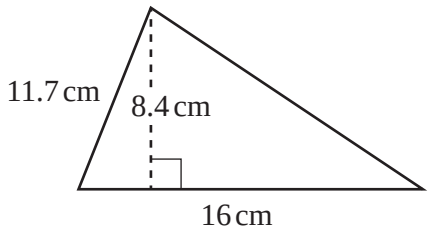
This shape is made from six of these rectangles.

Find the area and perimeter of this shape.

Area = ... cm^2

Perimeter = ... cm [4]

(b)



NOT TO SCALE

Find the area of this triangle.

..... cm^2 [2]

(c) A circle has a circumference of 28 cm.

Work out the radius of the circle.

..... cm [2]

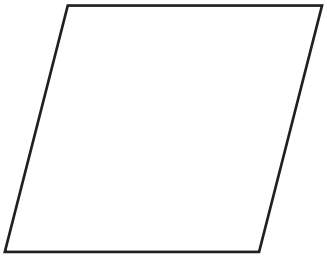
(d) A cube has a volume of $125\,m^3$.

Work out the surface area of the cube.

..... m^2 [3]

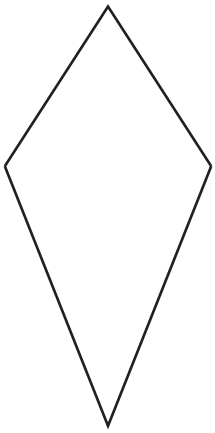
6 **(a)** For each quadrilateral, draw any lines of symmetry and write down its mathematical name.

(i)



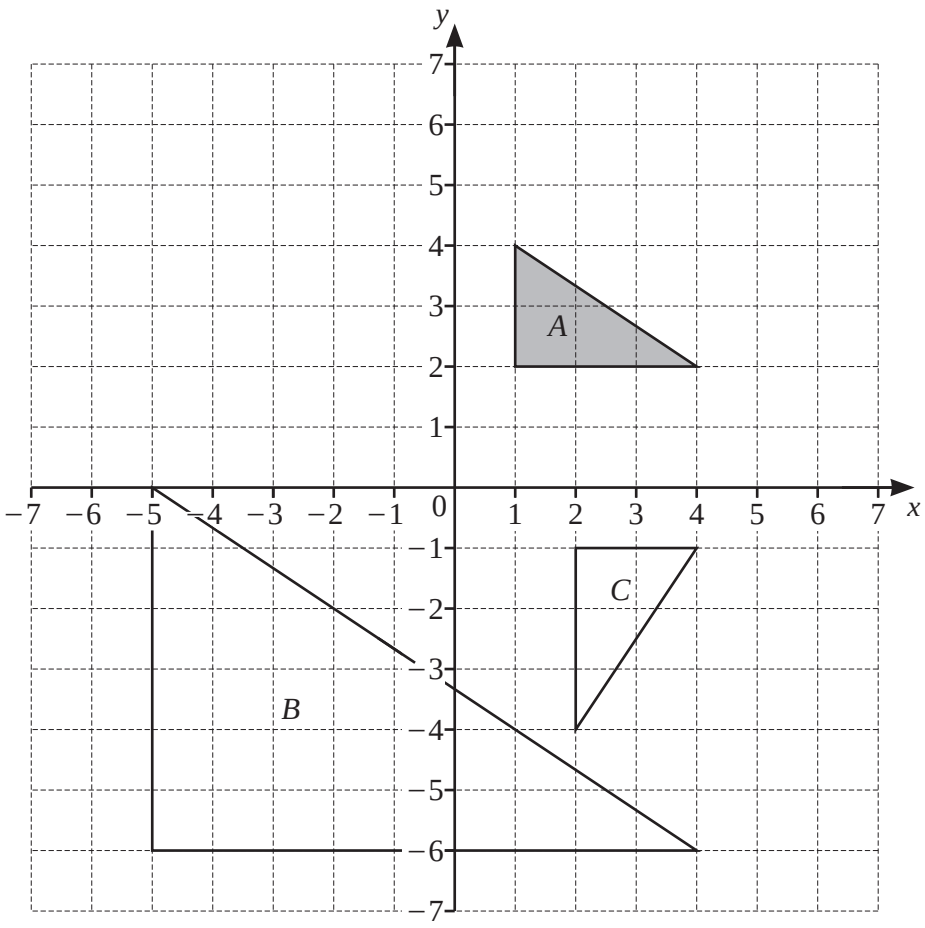
Name ..... [3]

(ii)



Name ..... [2]

(b) The diagram shows three triangles *A*, *B* and *C*, on a grid.



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

(a) triangle *A* onto triangle *B*

.....

..... [3]

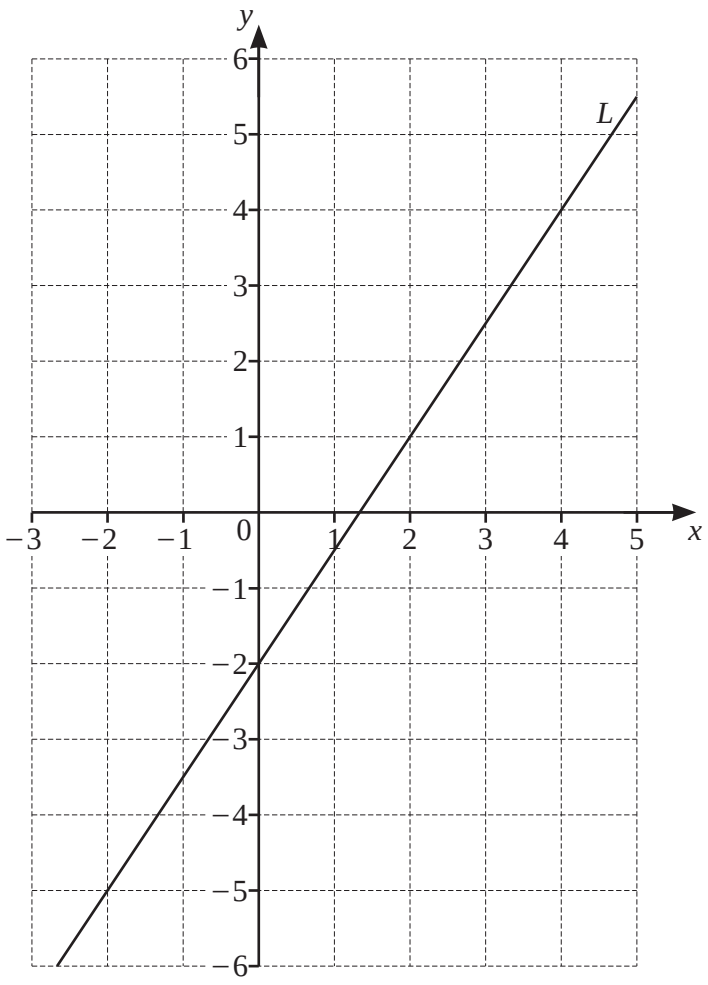
(b) triangle *A* onto triangle *C*.

.....

..... [3]

(ii) On the grid, reflect triangle *A* in the line $x = -1$. [2]

7 (a)



(i) Find the equation of line L.
Give your answer in the form $y = mx + c$.

$y =$ ..... [2]

(ii) On the grid, draw the line $y = 1$. [1]

(iii) Write down the coordinates of the point where the two lines intersect.

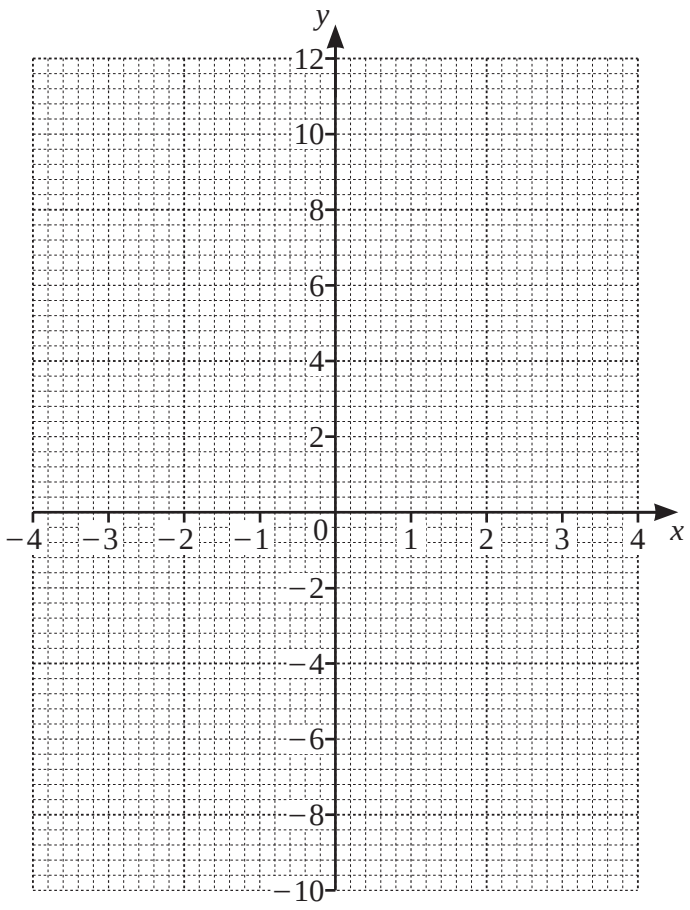
(..... , ...) [1]

(b) (i) Complete the table of values for $y = x^2 + x - 8$.

x	-4	-3	-2	-1	0	1	2	3	4
y	4	-2		-8	-8		-2	4	

[2]

(ii) On the grid, draw the graph of $y = x^2 + x - 8$ for $-4 \leqslant x \leqslant 4$.



[4]

(iii) Write down the equation of the line of symmetry of the graph.

..... [1]

(iv) Use your graph to solve the equation $x^2 + x - 8 = 0$.

$x =$ ..... or $x =$ ..... [2]

8 **(a)** $T = 5P + 3Q$

Find the value of T when $P = 6$ and $Q = 8$.

$T =$ ..... [2]

(b) Simplify.

$3a - 7b + 2a + 4b$

..... [2]

(c) Multiply out.

$5(2x - 3y)$

..... [1]

(d) Solve.

$5x - 1 = 3x + 19$

$x =$ ..... [2]

(e) Make t the subject of the formula $p = 5t - 3$.

$t =$ ..... [2]

(f) Entry to a castle costs \$$x$ for an adult and \$$y$ for a child.

Entry for 2 adults and 3 children costs \$15.00 .
Entry for 3 adults and 5 children costs \$23.50 .

Write down a pair of simultaneous equations to show this information and solve them to find the value of x and the value of y.
You must show all your working.

$x =$ .....

$y =$ ..... [6]

9 **(a)** These are the first four terms of a sequence.

2 8 14 20

(i) Write down the next term.

..... [1]

(ii) Write down the term to term rule for continuing the sequence.

..... [1]

(iii) Find an expression for the *n*th term.

..... [2]

(b) **(i)** Find the first three terms of the sequence with *n*th term $n^2 + 5$.

..... , ... , ... [2]

(ii) These are the first four terms of another sequence.

7 10 15 22

Find an expression for the *n*th term of this sequence.

..... [1]

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