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**MATHEMATICS****0580/32**

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) $\frac{5 \sin 30 - 8}{11}$.

..... [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]

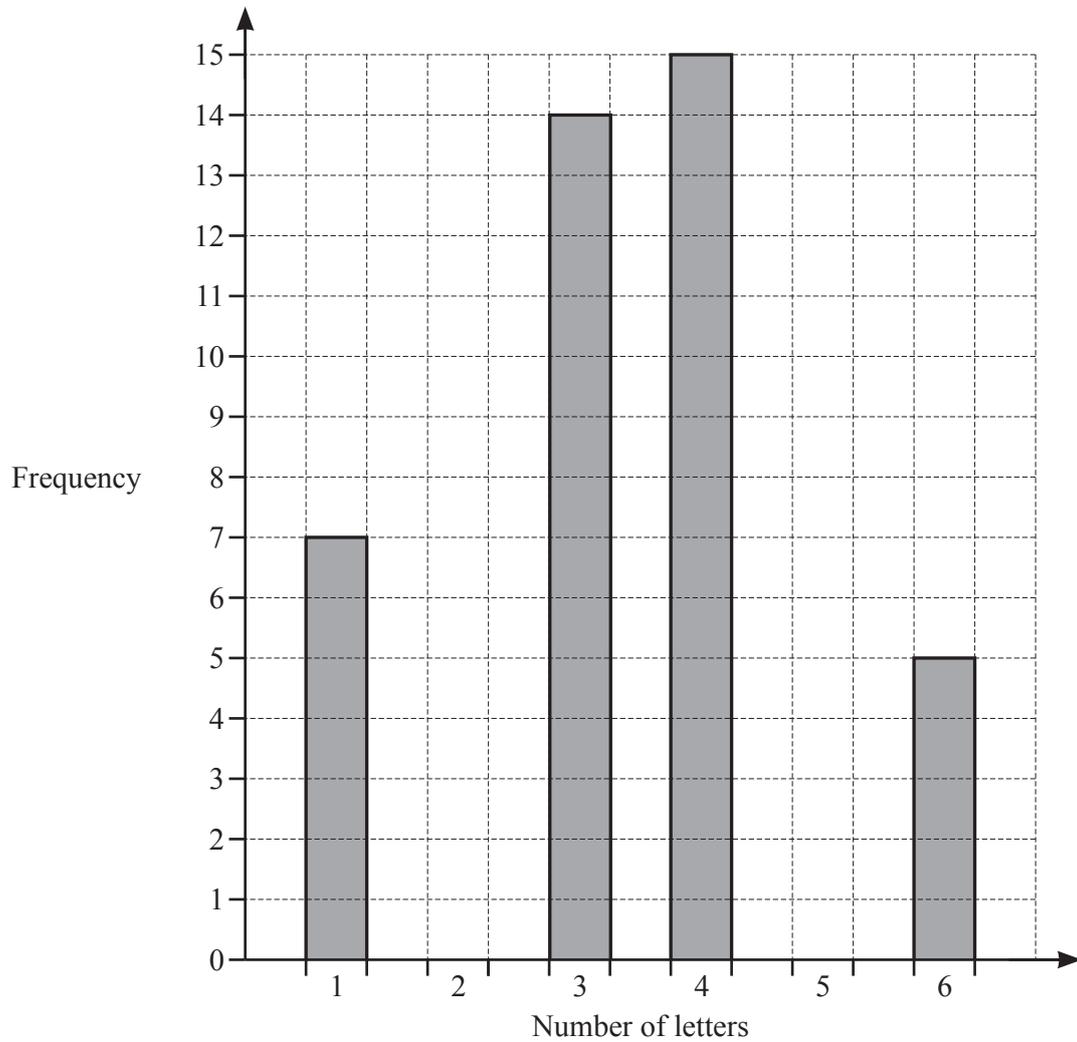
- (ii) The cyclist increases speed from 8.5 m/s to 10.2 m/s.

Work out the percentage increase in speed.

..... % [2]

- 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.

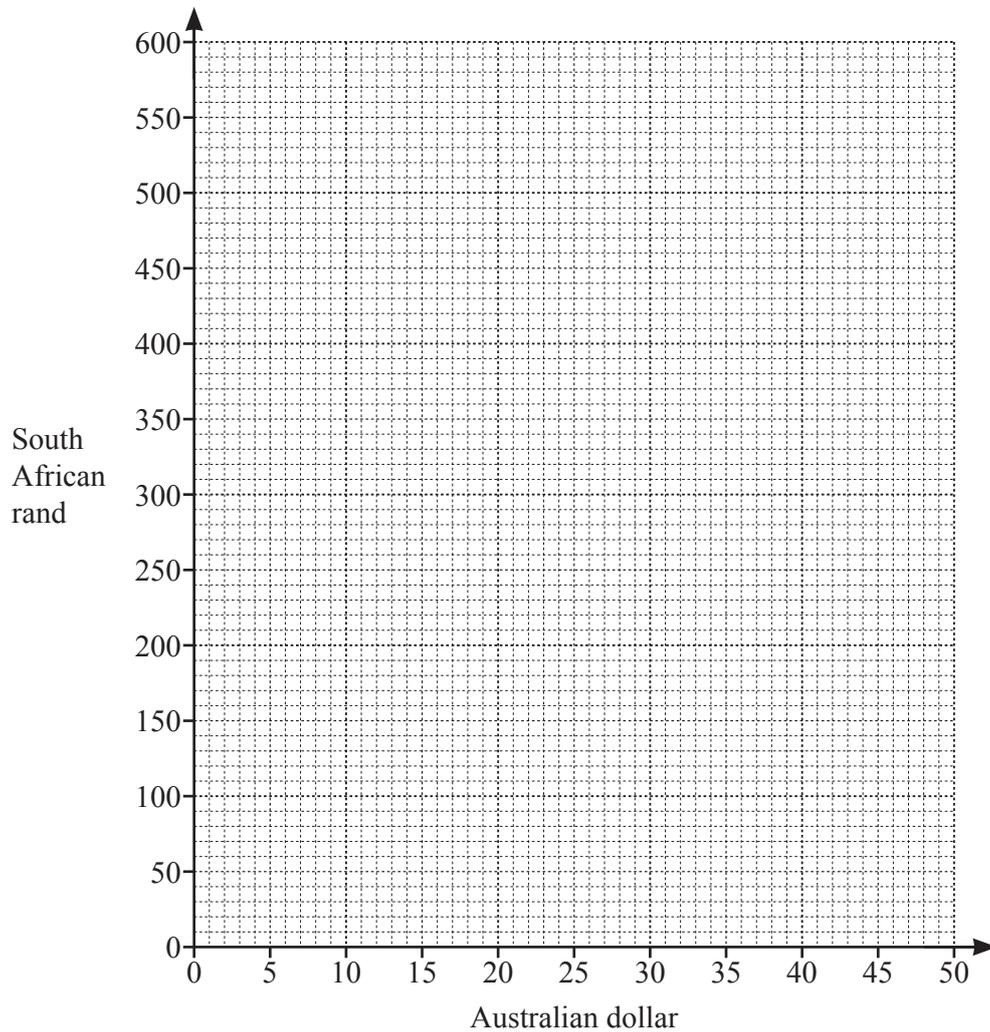
..... [2]

- (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.

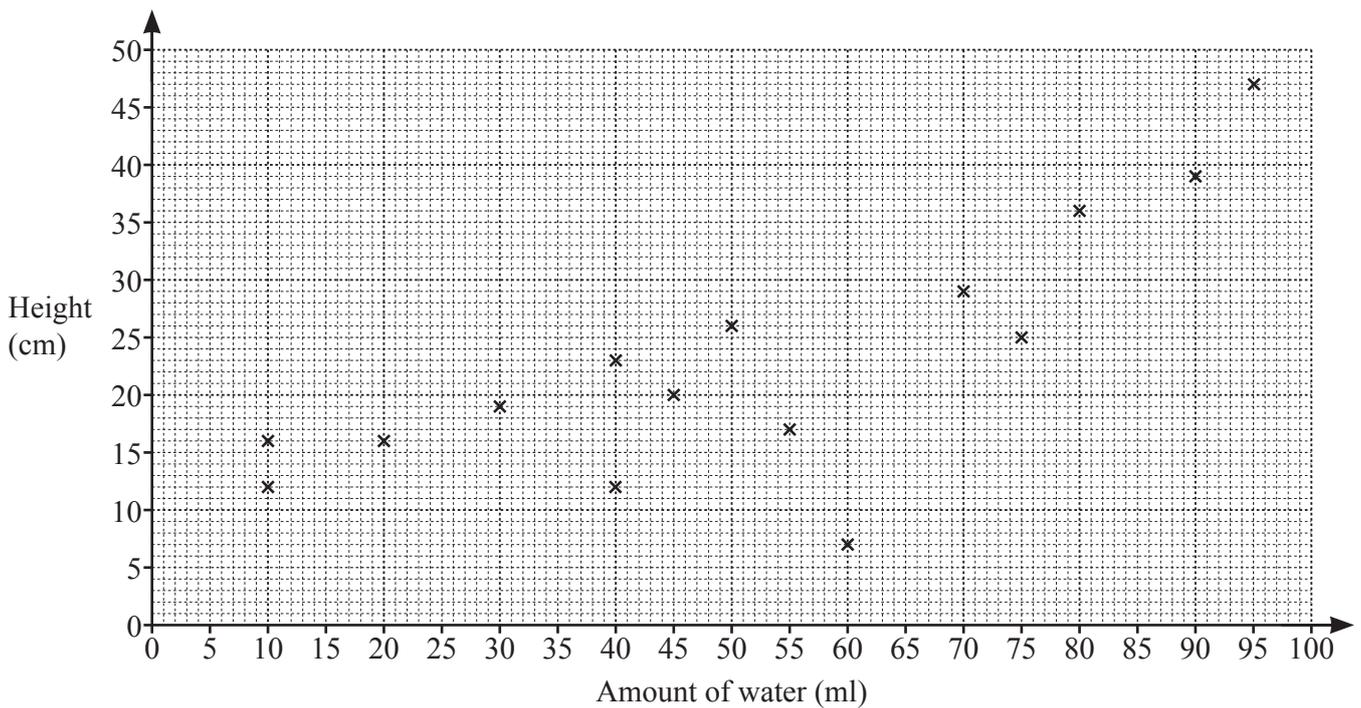
..... [2]

- (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]

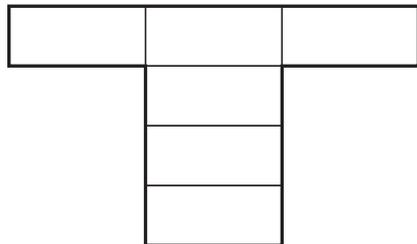
(e) Find the percentage of these 17 plants that have a height of more than 24 cm.
Give your answer correct to 1 decimal place.

..... % [3]

5 (a)

NOT TO
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This rectangle has an area of 12 cm^2 and a perimeter of 16 cm .

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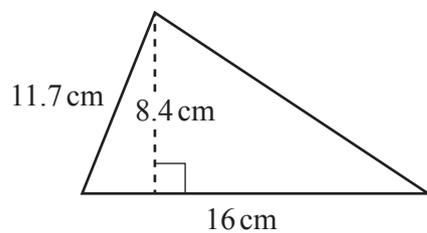
This shape is made from six of these rectangles.

Find the area and perimeter of this shape.

Area = cm^2

Perimeter = cm [4]

(b)

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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]

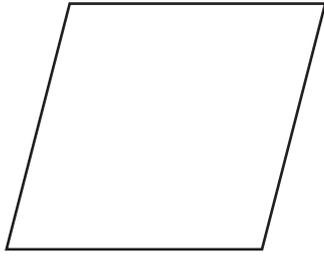
- (d) A cube has a volume of 125 m^3 .

Work out the surface area of the cube.

..... m^2 [3]

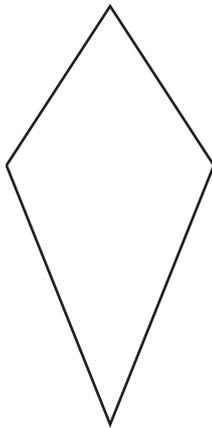
6 (a) For each quadrilateral, draw any lines of symmetry and write down its mathematical name.

(i)



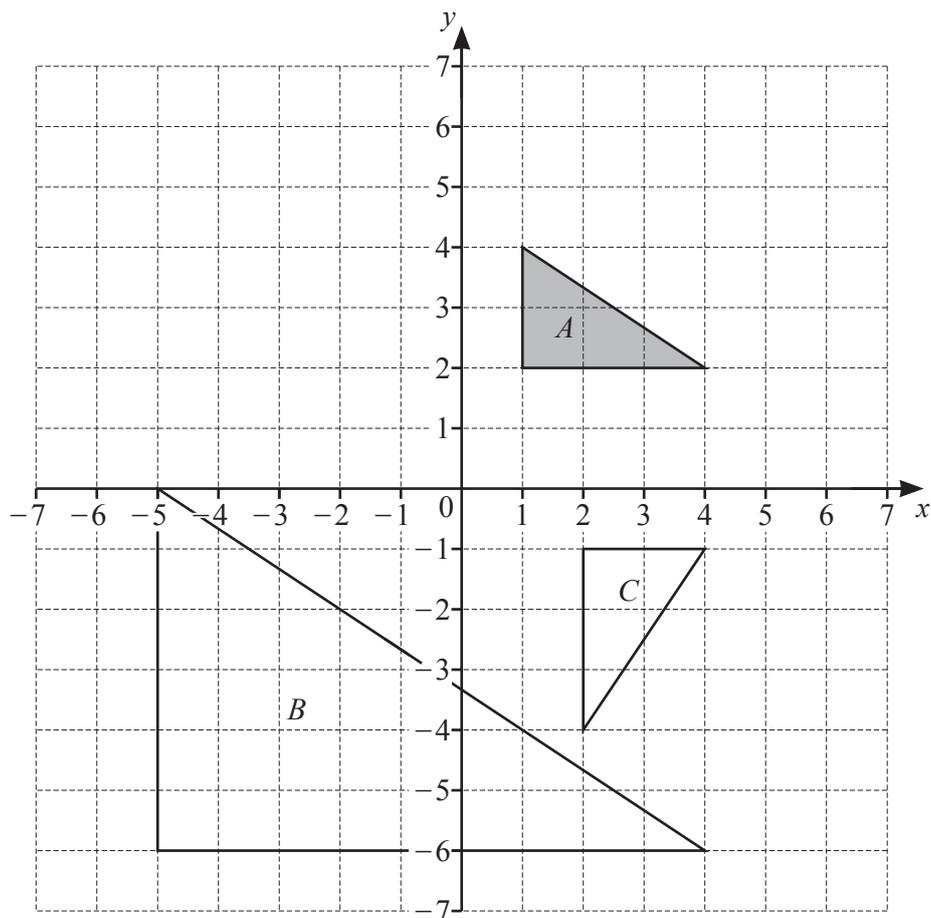
Name [3]

(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]

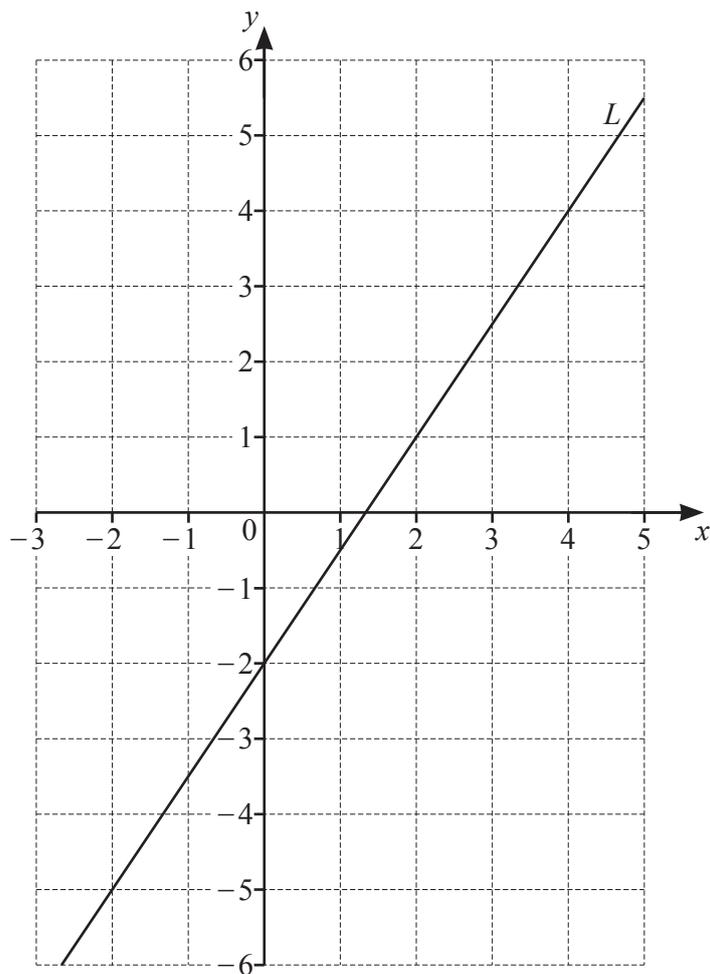
(b) triangle A onto triangle C .

.....
 [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 $y = mx + c$.

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

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

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

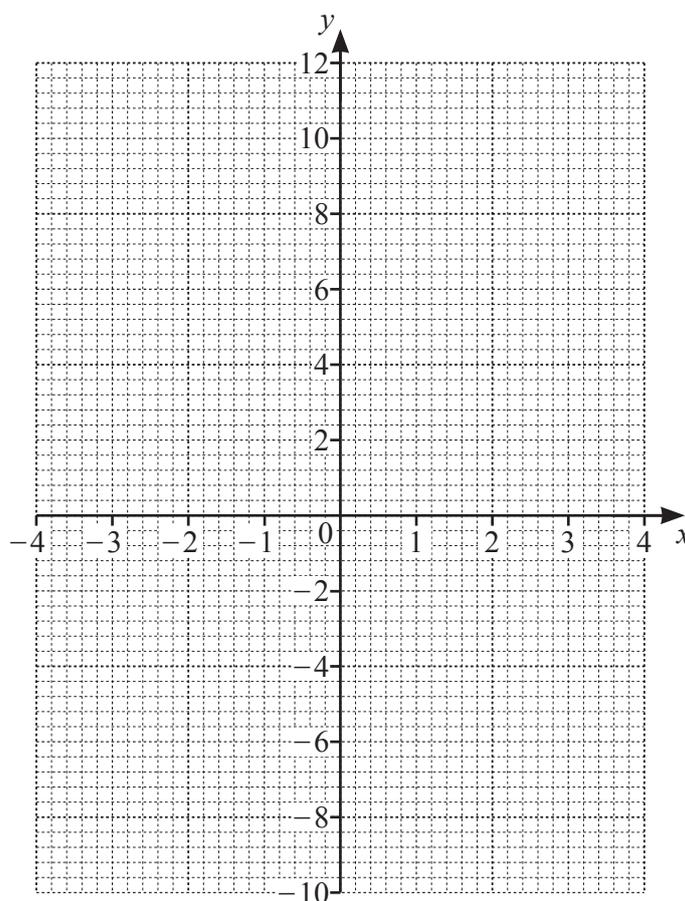
$$(\dots\dots\dots, \dots\dots\dots) [1]$$

- (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 $-4 \leq x \leq 4$.



[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 $Q = 8$.

$T = \dots\dots\dots$ [2]

(b) Simplify.

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

$\dots\dots\dots$ [2]

(c) Multiply out.

$$5(2x - 3y)$$

$\dots\dots\dots$ [1]

(d) Solve.

$$5x - 1 = 3x + 19$$

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

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

$t = \dots\dots\dots$ [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.

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [6]$$

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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