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0580/31

October/November 2017

2 hours

Additional Materials: Electronic calculator Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

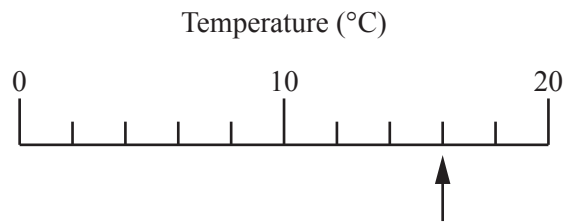
For π , use either your calculator value or 3.142.

The total of the marks for this paper is 104.

This document consists of **16** printed pages.

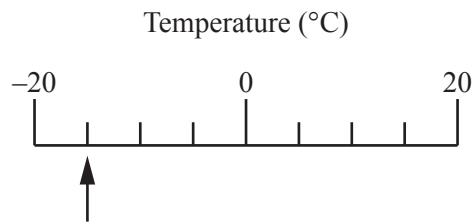
- 1 (a) Write down the temperature shown by each arrow.

(i)



..... $^{\circ}\text{C}$ [1]

(ii)



..... $^{\circ}\text{C}$ [1]

- (b) The table shows the daily temperature in Hayville for one week in January.

Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Temperature ($^{\circ}\text{C}$)	-4	2	-1	0	1	-6	-2

- (i) Which was the coldest day?

..... [1]

- (ii) Find the difference between the temperature on Sunday and the temperature on Monday.

..... $^{\circ}\text{C}$ [1]

- (c) In Grassington, the temperature recorded at 0735 was -3°C .

- (i) The temperature was recorded again $8\frac{1}{2}$ hours later.

At what time was this temperature recorded?

..... [1]

- (ii) By this time, the temperature had risen by 7°C .

Find this temperature.

..... $^{\circ}\text{C}$ [1]

2 Jeff owns a clothes shop.

(a)

Shirt	Tie	Coat
\$24	\$12.50	\$46

A customer buys 3 shirts, 5 ties and 1 coat.

Calculate the total cost.

\$ [3]

(b) A jacket has a price of \$64.
Jeff increases this price by 8%.

Calculate the new price.

\$ [2]

(c) Jeff also increases the price of a dress from \$250 to \$280.

Calculate the percentage increase in the price of the dress.

..... % [3]

(d) The shop has a rectangular floor measuring 5.5 m by 8.5 m.
The floor covering costs \$12 per square metre.

Calculate the cost of the floor covering.

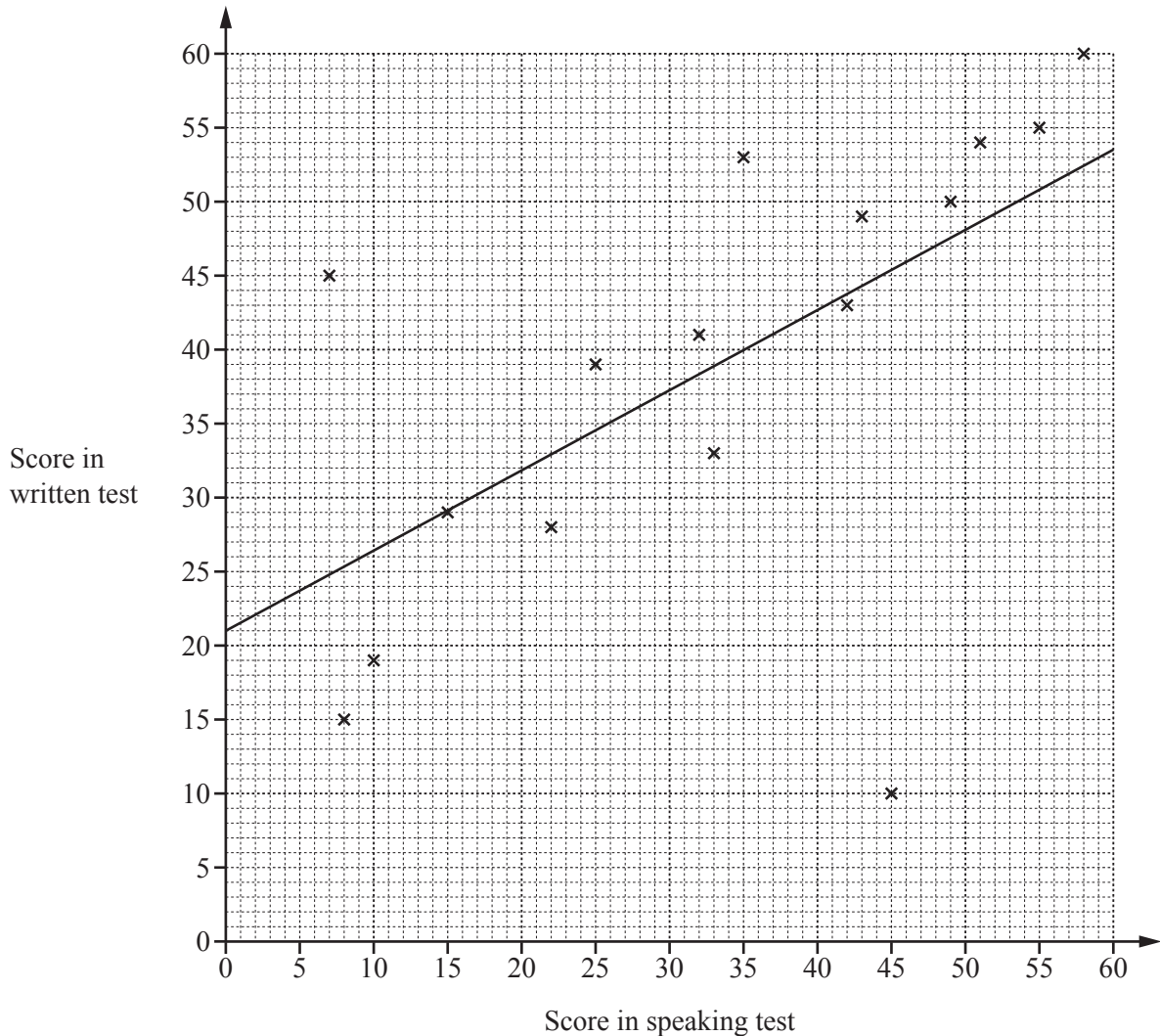
\$ [3]

(e) Jeff invests \$3600 for 3 years at a rate of 6% per year compound interest.

Work out the value of the investment at the end of the 3 years.

\$ [3]

- 3 (a) The scatter diagram shows the scores for each student in class A for the written test and the speaking test in French.
A line of best fit has been drawn.



- (i) Each test is marked out of 60.

In which test did the class perform better?
Give a reason for your answer.

..... because

..... [1]

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

..... [1]

- (iii) One student is much better at speaking French than writing French.

Put a ring around the cross that represents this student.

[1]

- (iv) One student scored 39 in the speaking test but was absent for the written test.

Use the line of best fit to estimate a score for this student in the written test.

..... [1]

(b) Here are the scores in the written test for class B.

21 14 48 32 8 29 41 39 30 23 17

Find

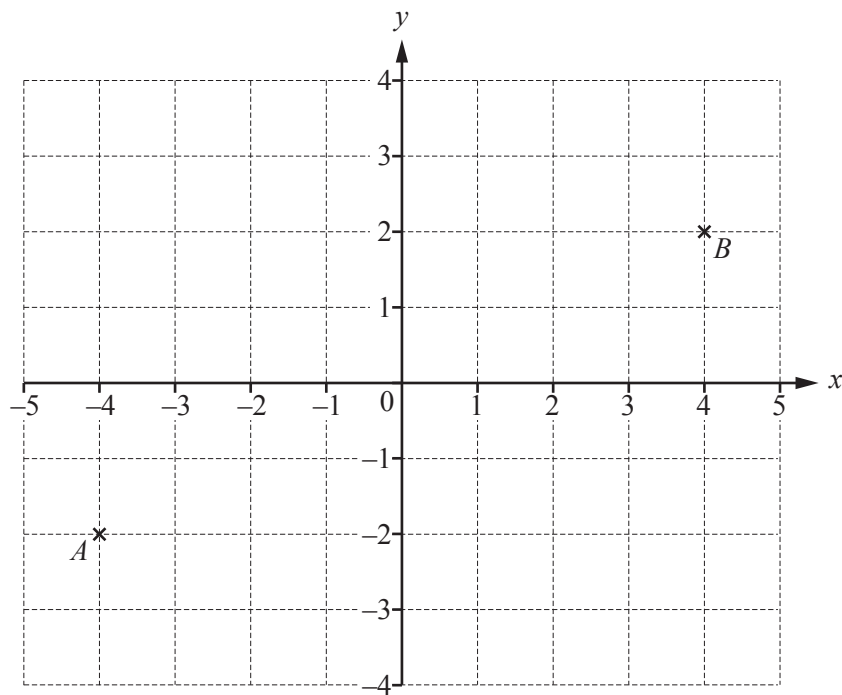
(i) the median,

..... [2]

(ii) the mean.

..... [2]

4 (a)



(i) Plot point C at $(-4, 2)$. [1]

(ii) Write down the mathematical name of the triangle formed by joining the points A , B and C .

..... [1]

(iii) Write down the vector $\overrightarrow{AB}$.

$$\overrightarrow{AB} = \begin{pmatrix} \\ \end{pmatrix} \quad [1]$$

(iv) (a) Find the gradient of the line AB .

..... [2]

(b) Write down the equation of the line AB .

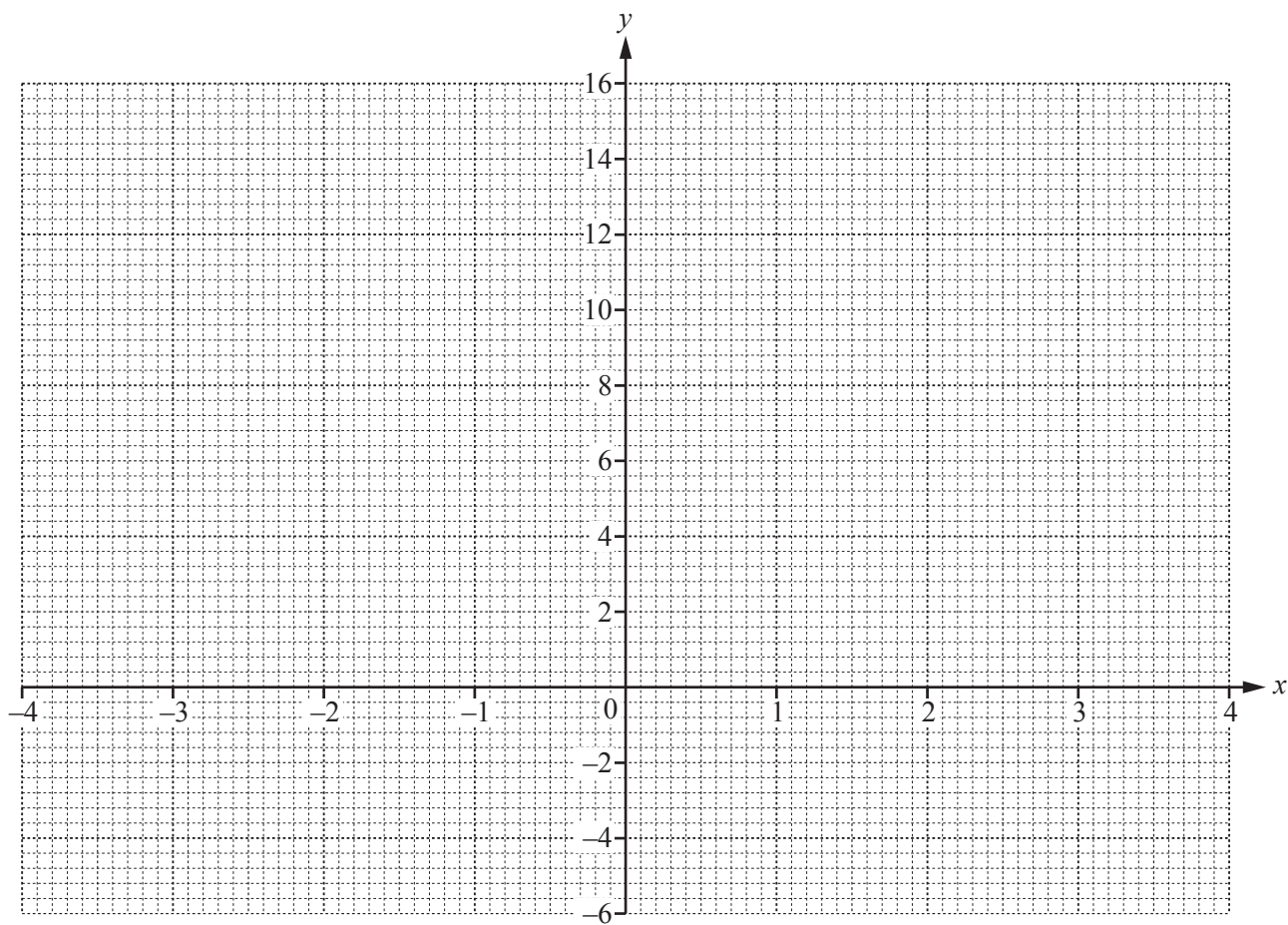
$y =$ [1]

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

x	-4	-3	-2	-1	0	1	2	3	4
y	7		-3			-3		7	

[3]

- (ii) On the grid below, draw the graph of $y = x^2 + x - 5$ for $-4 \leq x \leq 4$.

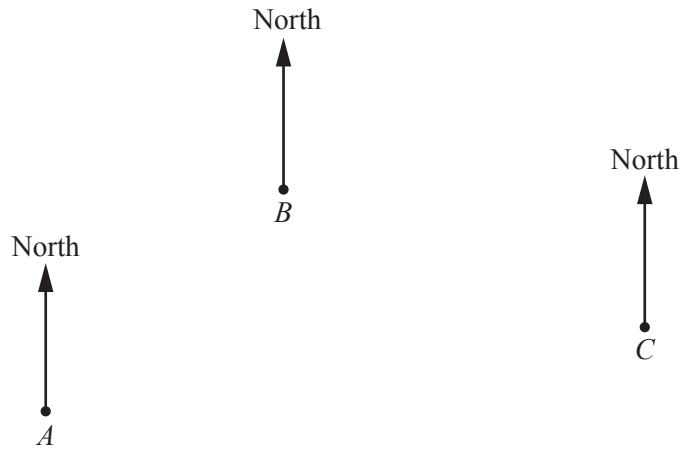


[4]

- (iii) Use your graph to solve the equation $x^2 + x - 5 = 0$.

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

- 5 The scale drawing shows the positions of three towns A , B and C .
The scale is 1 centimetre represents 12 kilometres.



Scale: 1 cm to 12 km

- (a) Find the actual distance between town A and town B .

..... km [2]

- (b) Measure the bearing of town B from town A .

..... [1]

- (c) Measure the bearing of town B from town C .

..... [1]

(d) Town D is 84 km from town A and 42 km from town C .

(i) **In this part, use a ruler and compasses only and show your construction arcs.**

On the diagram, construct a possible position for town D .

[3]

(ii) A plane takes 10 minutes to fly the 84 km from town A to town D .

Work out the average speed of the plane in kilometres per hour.

..... km/h [2]

(e) The bearing of town E from town A is 118° .

Work out the bearing of town A from town E .

..... [2]

6 (a) Find

(i) all the factors of 18,

..... [2]

(ii) a multiple of 30,

..... [1]

(iii) $\sqrt{2134.44}$,

..... [1]

(iv) 2.5^3 ,

..... [1]

(v) $(0.2)^{-1}$.

..... [1]

(b) Write 72 as a product of its prime factors.

..... [2]

(c) Find the lowest common multiple (LCM) of 16 and 30.

..... [2]

(d) Clock A chimes every 6 hours.
Clock B chimes every 9 hours.
Both clocks chime at 2 am.

At what time will the two clocks next chime together?

..... [3]

- 7 (a) Bag *A* contains 20 counters.
6 are red, 9 are blue and the rest are white.
Jared takes one counter at random.

Write down the probability that the counter is

- (i) red,

..... [1]

- (ii) white,

..... [1]

- (iii) yellow.

..... [1]

- (b) Bag *B* contains green counters, black counters, purple counters and brown counters.
Louise takes one counter at random.

Colour	Green	Black	Purple	Brown
Probability		0.3	0.24	0.18

Complete the table.

[2]

- (c) Bag *C* contains 8 red counters and 12 blue counters only.
Bag *D* contains 6 red counters and 9 blue counters only.
A counter is taken at random from each bag.

Show that the probability of taking a red counter from bag *C* is equal to the probability of taking a red counter from bag *D*.

[3]

- 8 (a) Multiply out the brackets and simplify.

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

..... [2]

- (b) (i) An equilateral triangle has side length $2x$.

Write down an expression, in terms of x , for the perimeter of the triangle.
Give your answer in its simplest form.

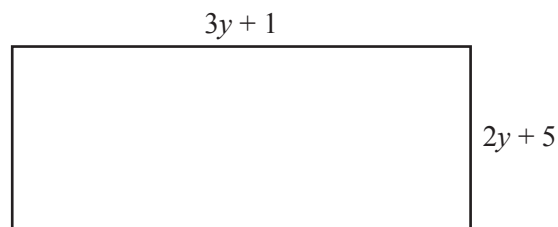
..... [1]

- (ii) A square has a perimeter of $20a$.

Write down an expression, in terms of a , for the length of one side of the square.
Give your answer in its simplest form.

..... [1]

- (c) The diagram shows a rectangle.



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Find an expression, in terms of y , for the perimeter of the rectangle.
Give your answer in its simplest form.

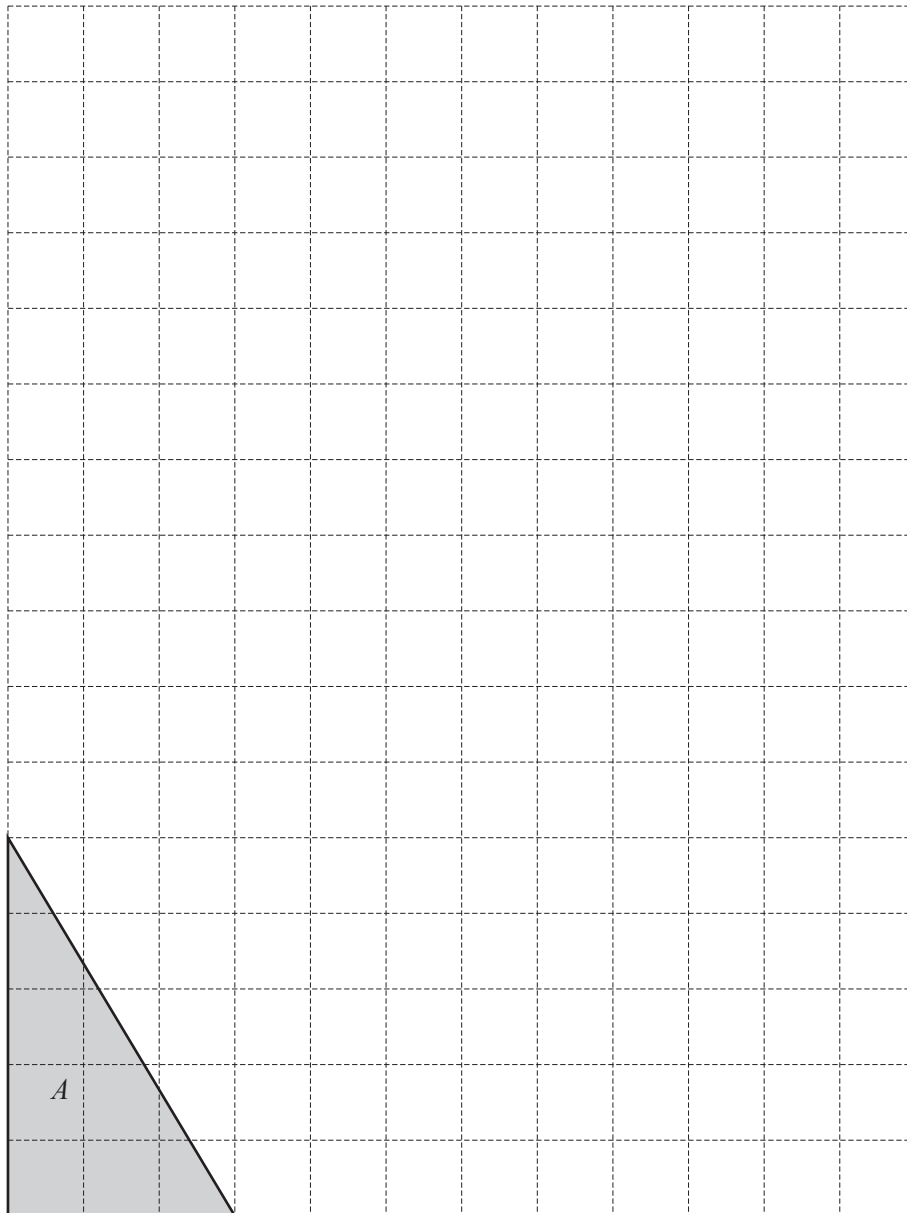
..... [3]

- (d) One mint costs m cents.
One toffee costs 6 cents more than one mint.
The cost of 3 mints and 7 toffees is 182 cents.

Write an equation, in terms of m , and solve it to find the cost of one mint.

Cost of one mint = cents [5]

- 9 (a) The diagram shows a triangle, A , on a 1 cm^2 grid.

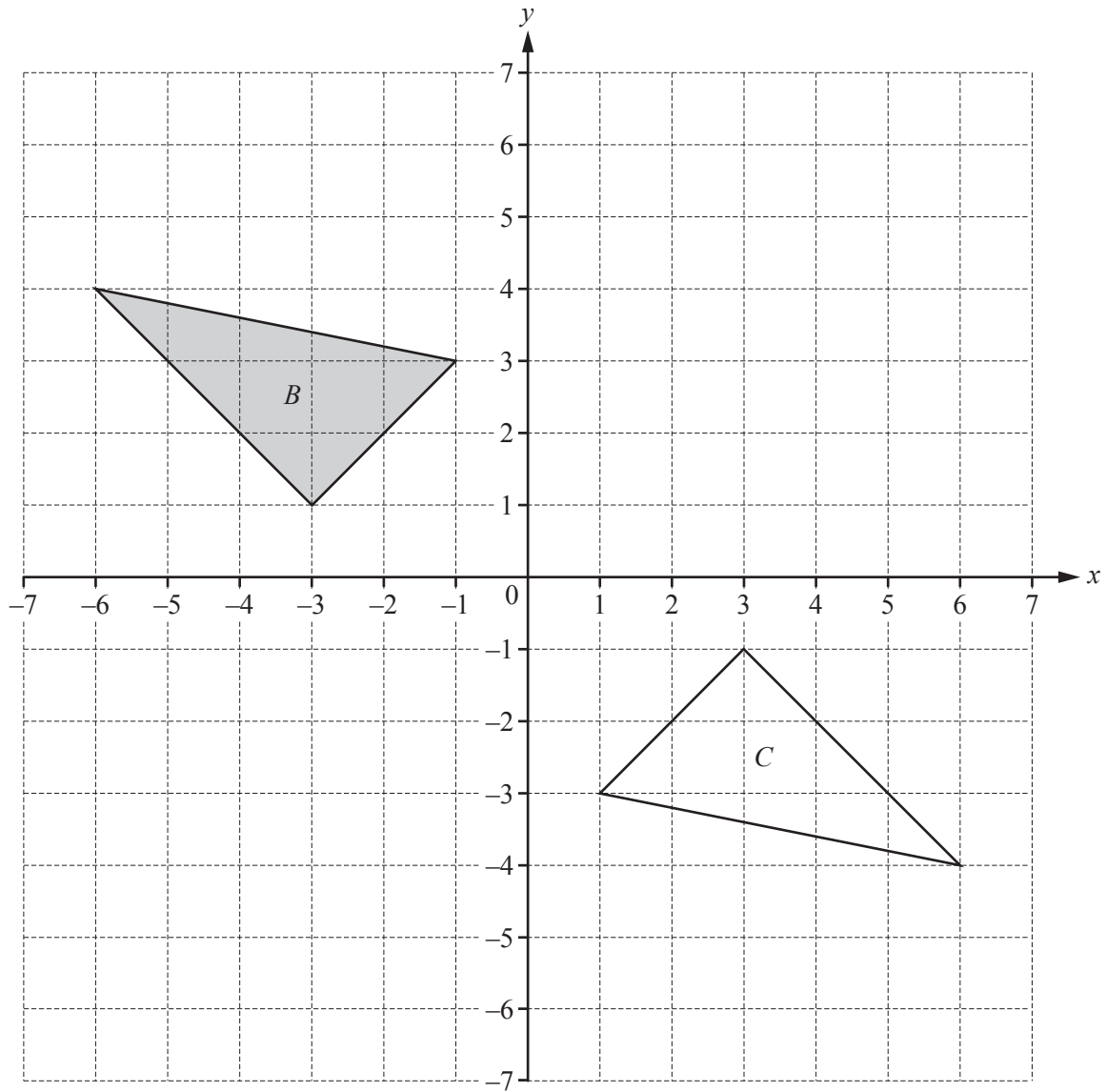


- (i) Find the area of triangle A .

..... cm^2 [2]

- (ii) On the grid, draw an enlargement of triangle A with scale factor 2. [2]

(b)



- (i) Describe fully the **single** transformation that maps triangle B onto triangle C .

.....
 [3]

- (ii) Reflect triangle B in the line $y = -1$. [2]

- (iii) Translate triangle B by the vector $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$. [2]

Question 10 is printed on the next page.

- 10 (a) These are the first four terms of a sequence.

-2 6 14 22

- (i) Write down the next term.

..... [1]

- (ii) Write down the rule for continuing the sequence.

..... [1]

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

..... [2]

- (b) The n th term of another sequence is $5(n + 1) - 6$.

Write down the second term of this sequence.

..... [1]

- (c) These are the first four terms of a different sequence.

-2 1 8 19

Write down the next term of this sequence.

..... [1]

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