Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0521340676

MATHEMATICS **0580/31**

Paper 3 (Core) **October/November 2017**

2 hours

Candidates answer on the Question Paper.

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

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

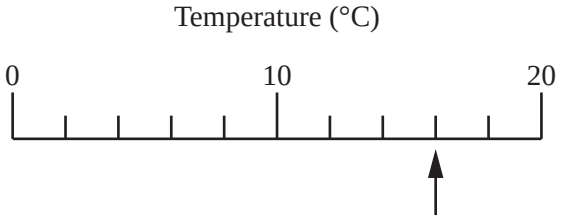
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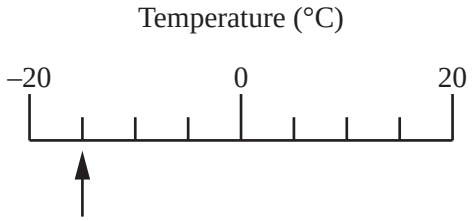
1 **(a)** Write down the temperature shown by each arrow.

(i)



..... °C [1]

(ii)



..... °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 (°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.

..... °C [1]

(c) In Grassington, the temperature recorded at 07 35 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.

..... °C [1]

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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]

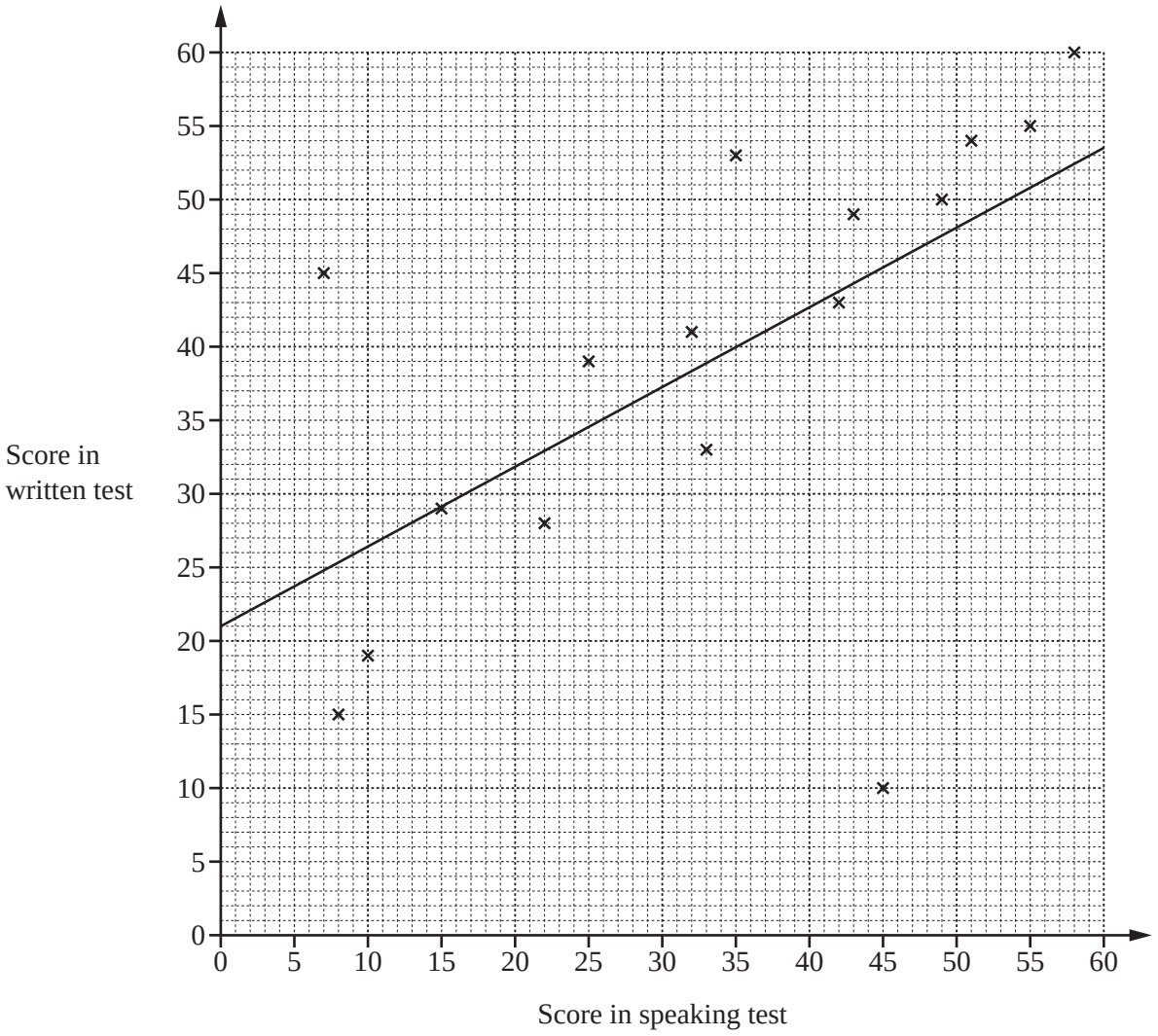
(e) Jeff invests $3600 for 3 years at a rate of 6% per year compound interest.

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

$ ..... [3]

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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]

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

21 14 48 32 8 29 41 39 30 23 17

Find

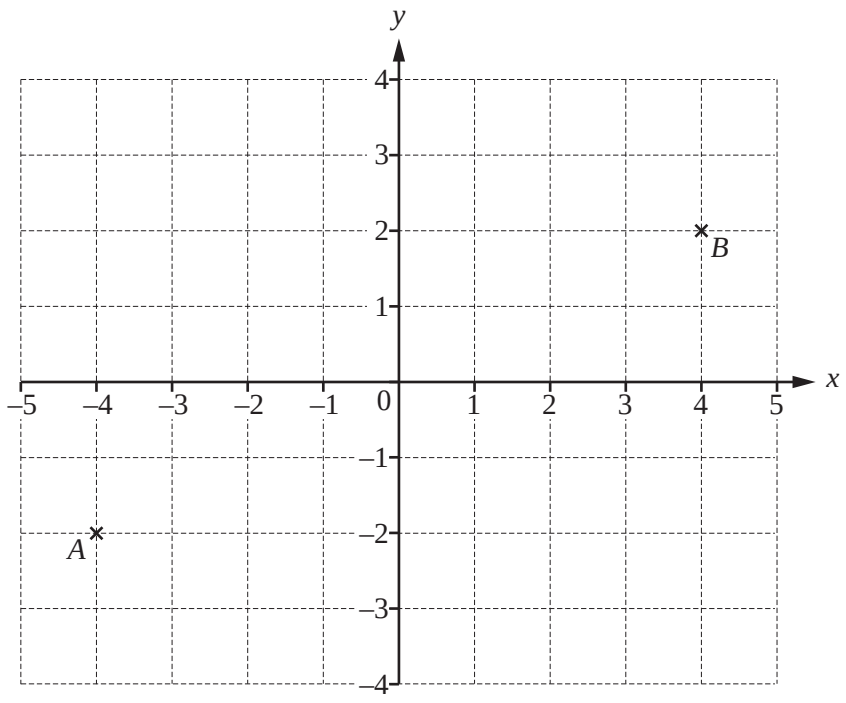
(i) the median,

..... [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 $\overrightarrow{AB}$.

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

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

..... [2]

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

$y =$ ..... [1]

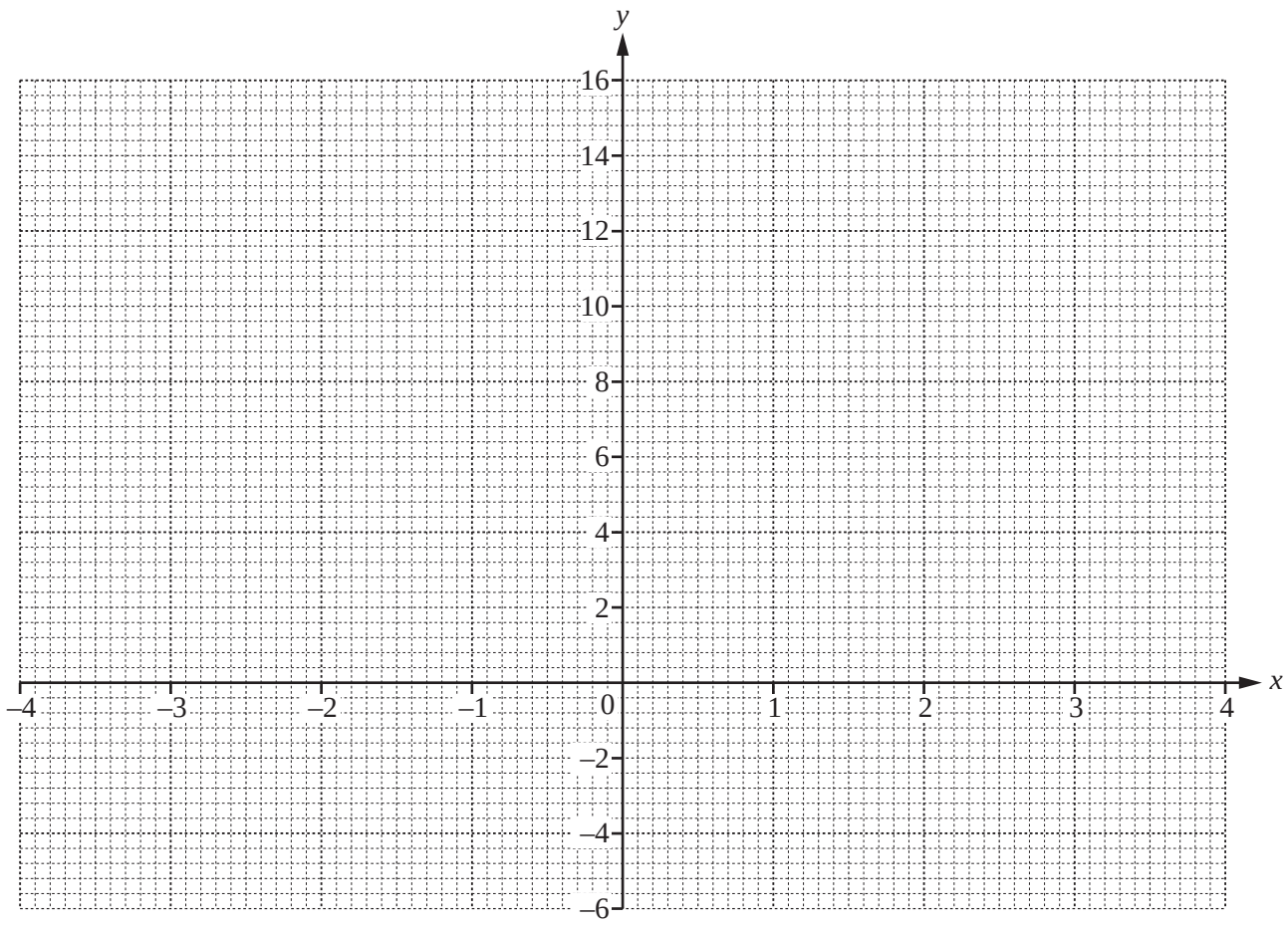
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(b) (i) Complete the table of values for $y = x^2 + x - 5$.

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 $-4 \leqslant x \leqslant 4$.

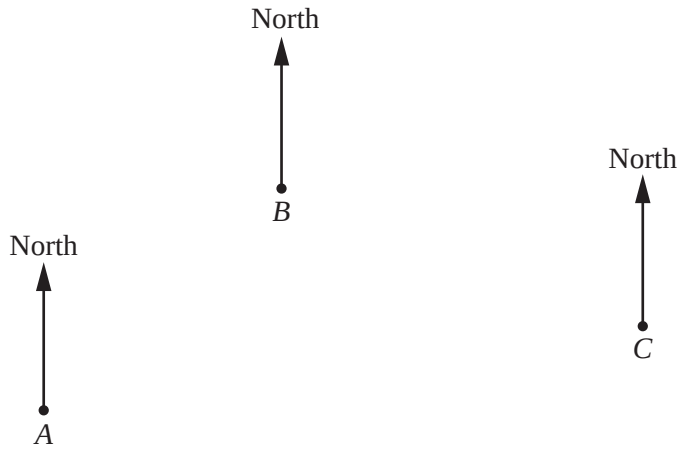


[4]

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

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

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(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]

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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]

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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.



NOT TO SCALE

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

..... [3]

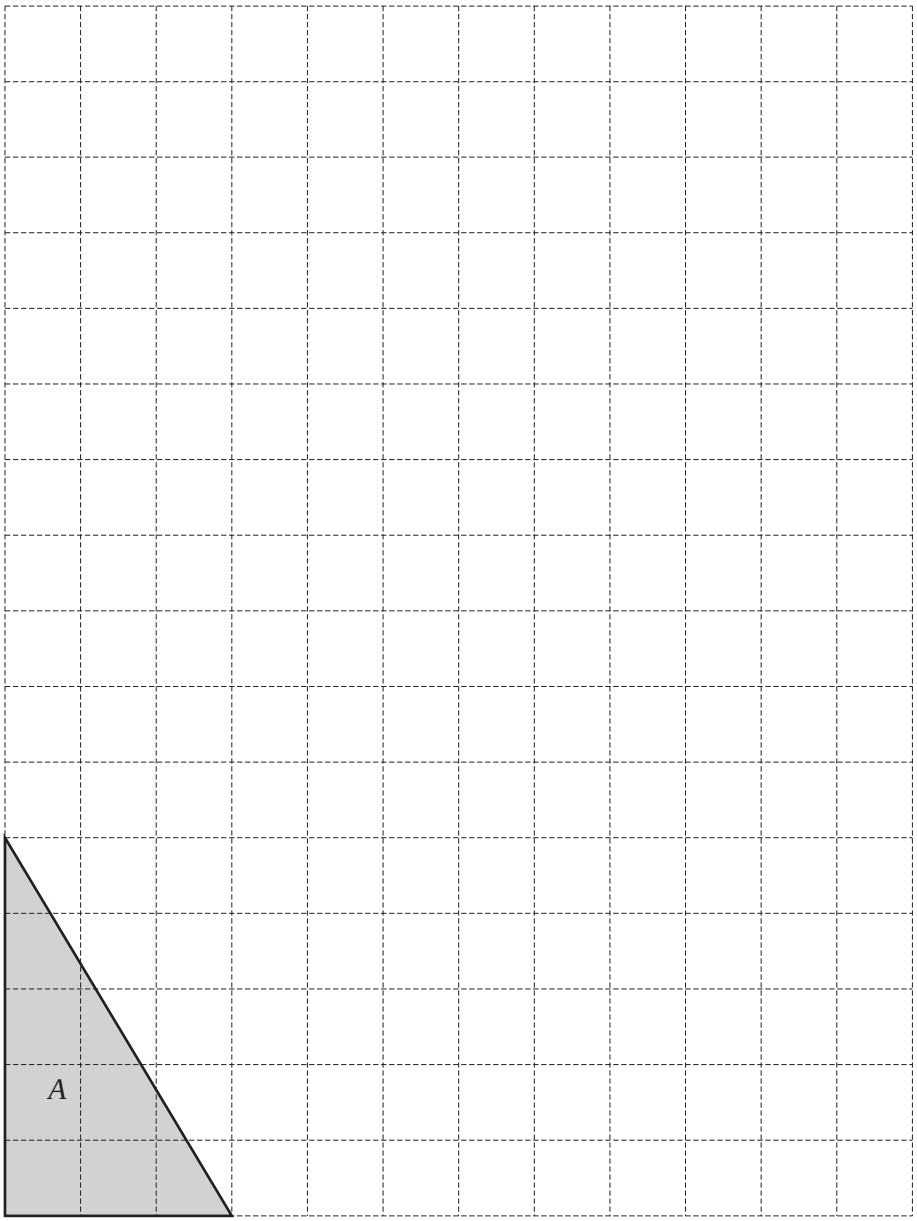
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(d) One mint costs m cents.
One toffee costs 6 cents more than one mint.
The cost of 3 mints and 7 toffees is 182 cents.

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.



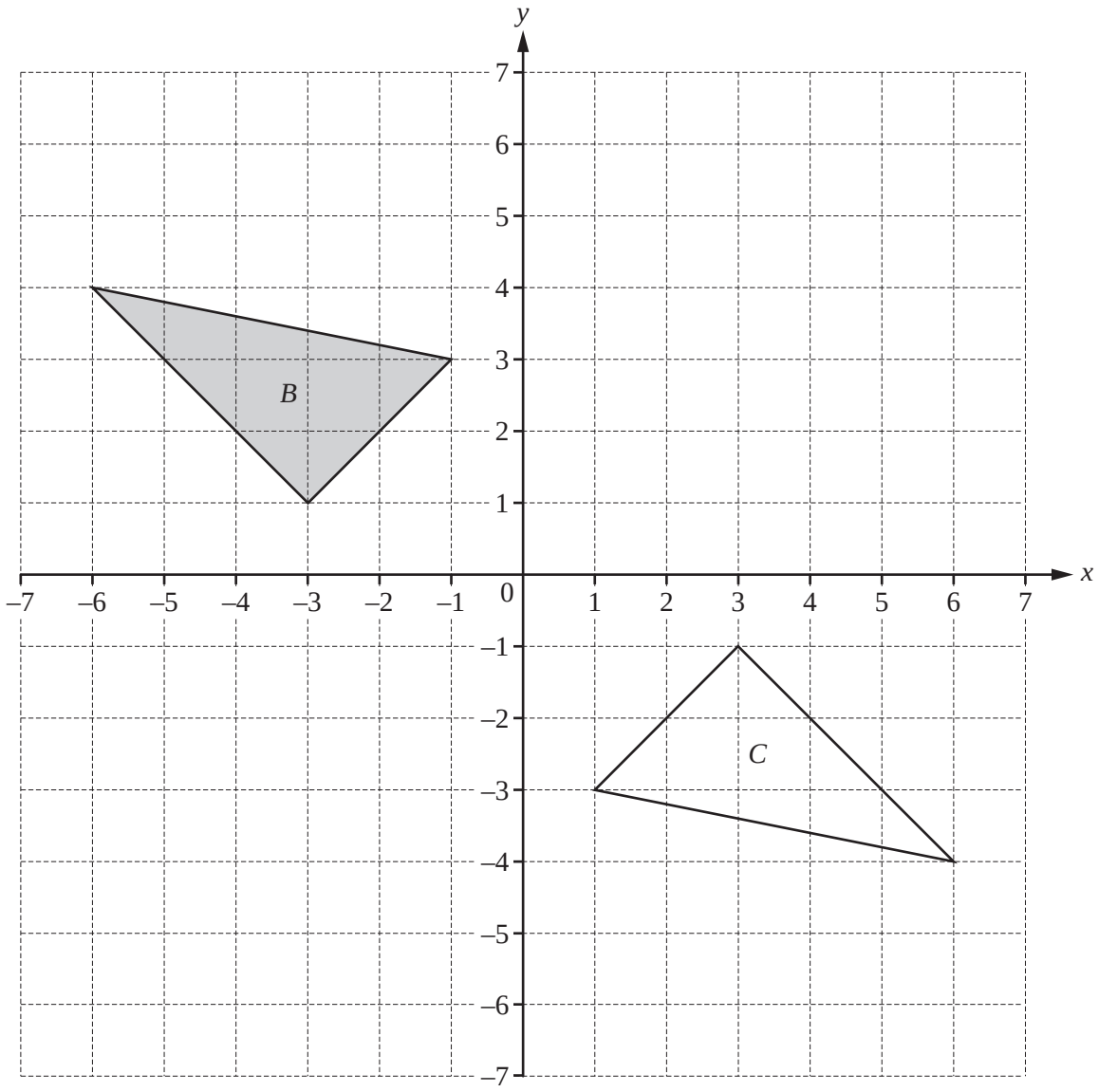
(i) Find the area of triangle A.

.....cm^2 [2]

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

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(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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