UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

MATHEMATICS **0580/33**

Paper 3 (Core) **May/June 2013**

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 a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, 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.

This document consists of **15** printed pages and **1** blank page.

For Examiner's Use

1 **(a)** Kasem earns \$900 each month.
14% of this amount is deducted for tax and insurance.

Show that he receives \$774 each month.

Answer(a)

[2]

(b) He pays $\frac{2}{9}$ of the \$774 in rent.

Calculate the amount of rent he pays.

Answer(b) \$ ..... [1]

(c) Kasem spends \$480 each month on food, entertainment and clothes.
He shares this in the ratio

food : entertainment : clothes = 9 : 3 : 4.

Calculate how much he spends on food each month.

Answer(c) \$ ..... [2]

(d) Kasem saves the rest of his money.

Work out the amount he saves as a percentage of \$774.

Answer(d) ..... % [2]

For Examiner's Use

2 **(a)**

2 $\sqrt{12}$ 144 40 $\sqrt{6.25}$ 110 11 4 80 0.25

From this list of numbers, write down

(i) a two-digit odd number,

Answer(a)(i) ..... [1]

(ii) a square number,

Answer(a)(ii) ..... [1]

(iii) the value of 2^{-2},

Answer(a)(iii) ..... [1]

(iv) an irrational number,

Answer(a)(iv) ..... [1]

(v) the lowest common multiple of 8 and 10,

Answer(a)(v) ..... [2]

(vi) the cube root of 8.

Answer(a)(vi) ..... [1]

(b) **(i)** Find the smallest factor, apart from 1, of 2013.

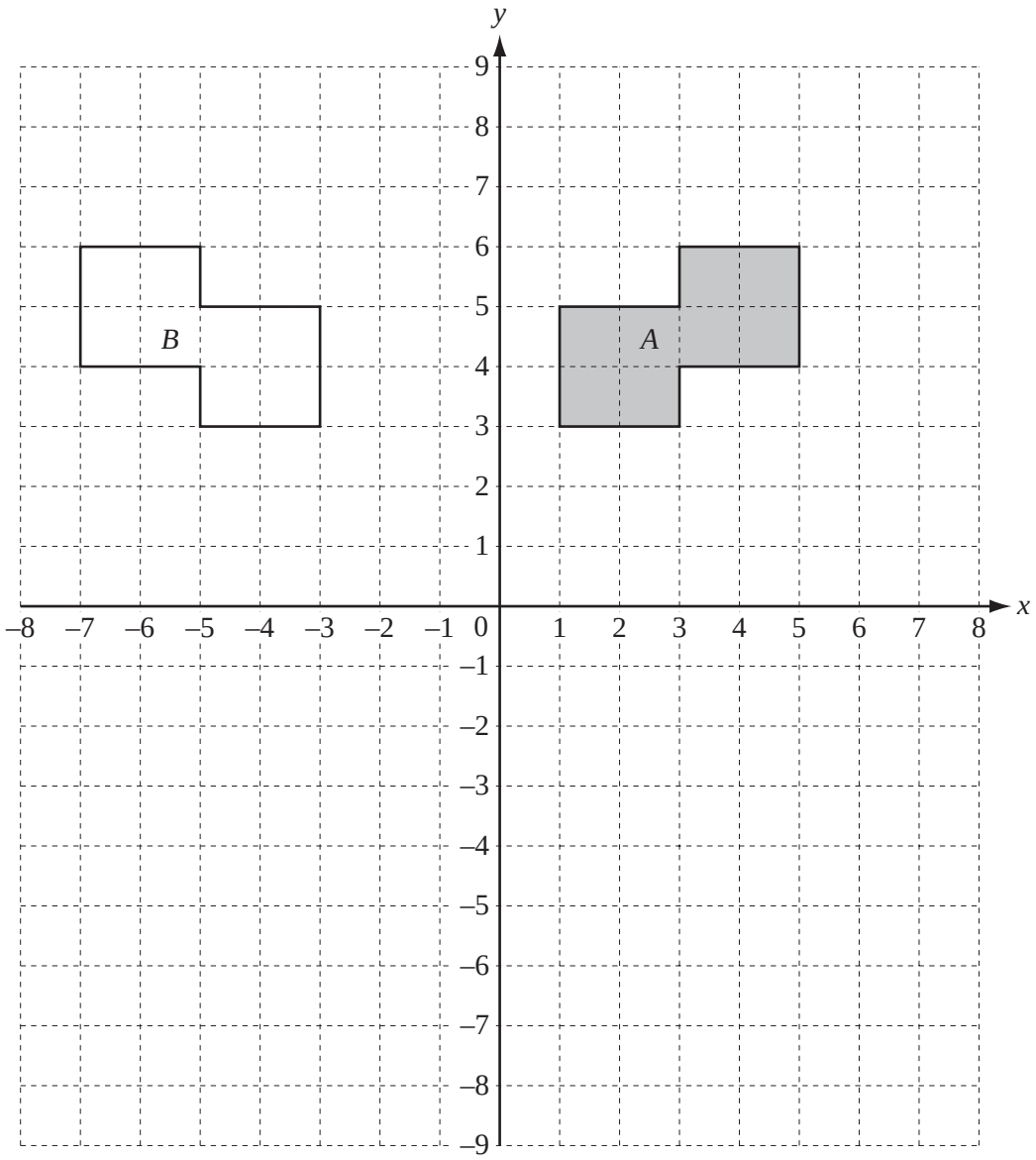
Answer(b)(i) ..... [1]

(ii) Write 2013 as the product of its prime factors.

Answer(b)(ii) ..... × ..... × ..... [2]

3

For Examiner's Use



(a) Write down the order of rotational symmetry of shape *A*.

Answer(a) ..... [1]

(b) Describe fully the **single** transformation which maps shape *A* onto shape *B*.

Answer(b) ..... [2]

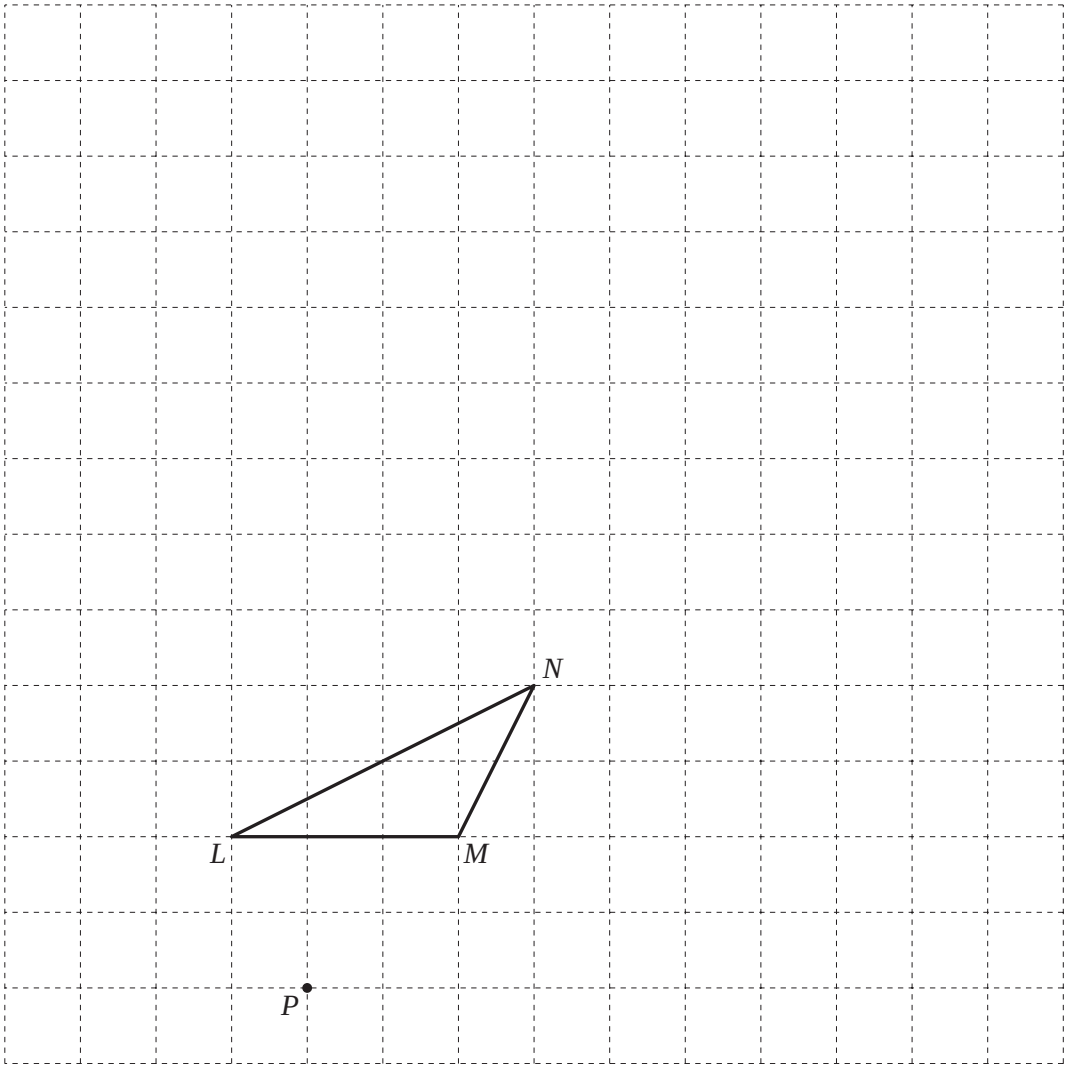
(c) **(i)** Translate shape *A* by the vector $\begin{pmatrix} -7 \\ -5 \end{pmatrix}$.
Label the image *C*. [2]

(ii) Rotate shape *A* through 90° clockwise about the origin.
Label the image *D*. [2]

For Examiner's Use

(d) Triangle *LMN* is drawn on the 1 cm^2 grid below.

(i) Enlarge triangle *LMN* by scale factor 3 from the centre *P*.



[2]

(ii) Write down the length of the base, *LM*, and the height of triangle *LMN*.

Answer(d)(ii) *LM* = ... cm

Height = ... cm [2]

(iii) Calculate the area of triangle *LMN*.

Answer(d)(iii) ..... cm^2 [2]

(iv) Find the area of the **enlarged** triangle.

Answer(d)(iv) ..... cm^2 [2]

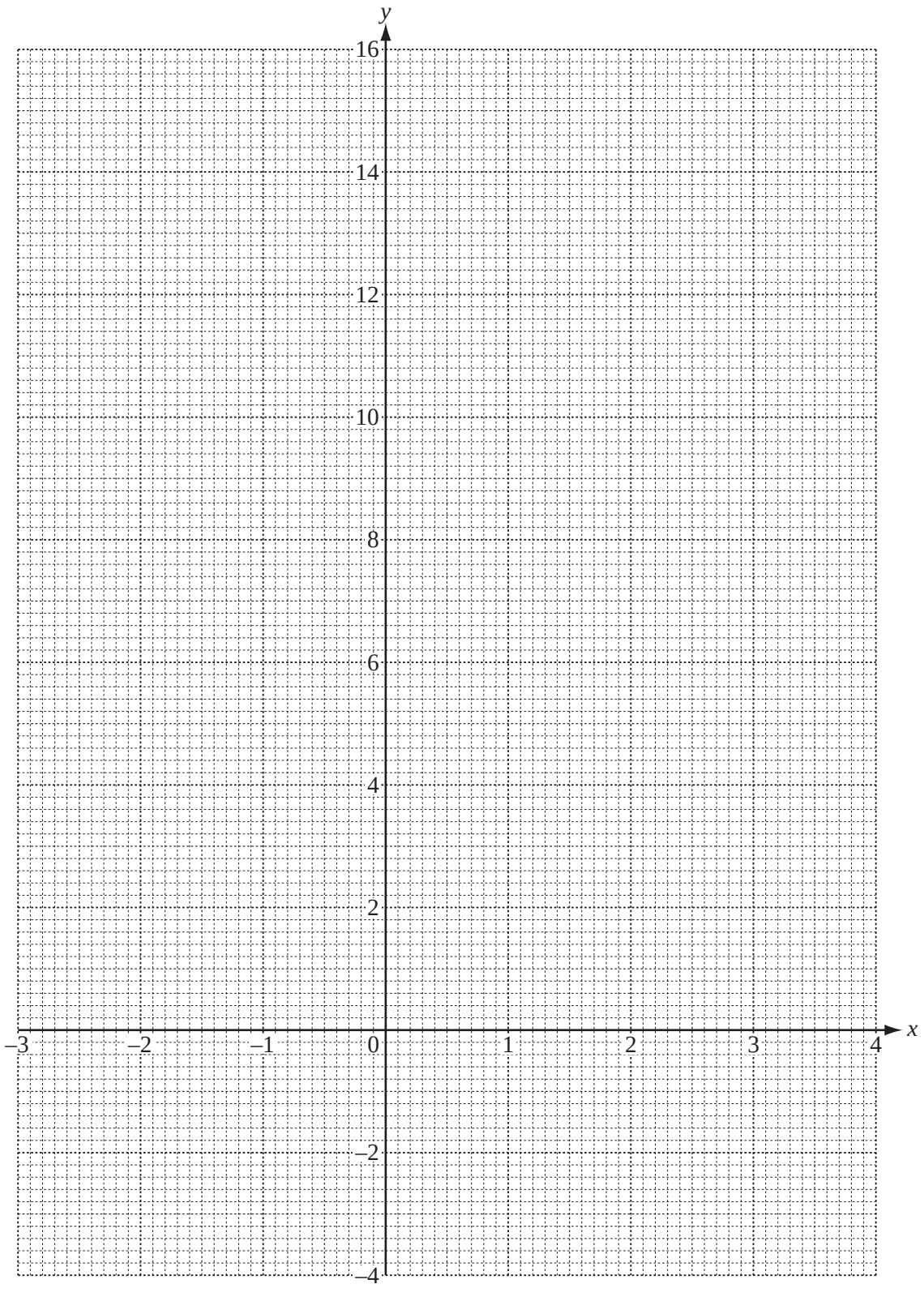
For Examiner's Use

4 **(a)** The table shows some values of $y = x^2 - 2x - 1$.

x	–3	–2	–1	0	1	2	3	4
y	14		2	–1	–2			7

(i) Complete the table. [2]

(ii) On the grid, draw the graph of $y = x^2 - 2x - 1$ for $-3 \leqslant x \leqslant 4$.



[4]

For Examiner's Use

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

Answer(b) ..... [1]

(c) The point with co-ordinates (–3, 7) lies on the line $y = -x + 4$.

(i) Write down the co-ordinates of two other points on this line.
Use x co-ordinates so that $-3 < x \leqslant 4$.

Answer(c)(i) (..... , ...) and (..... , ...) [2]

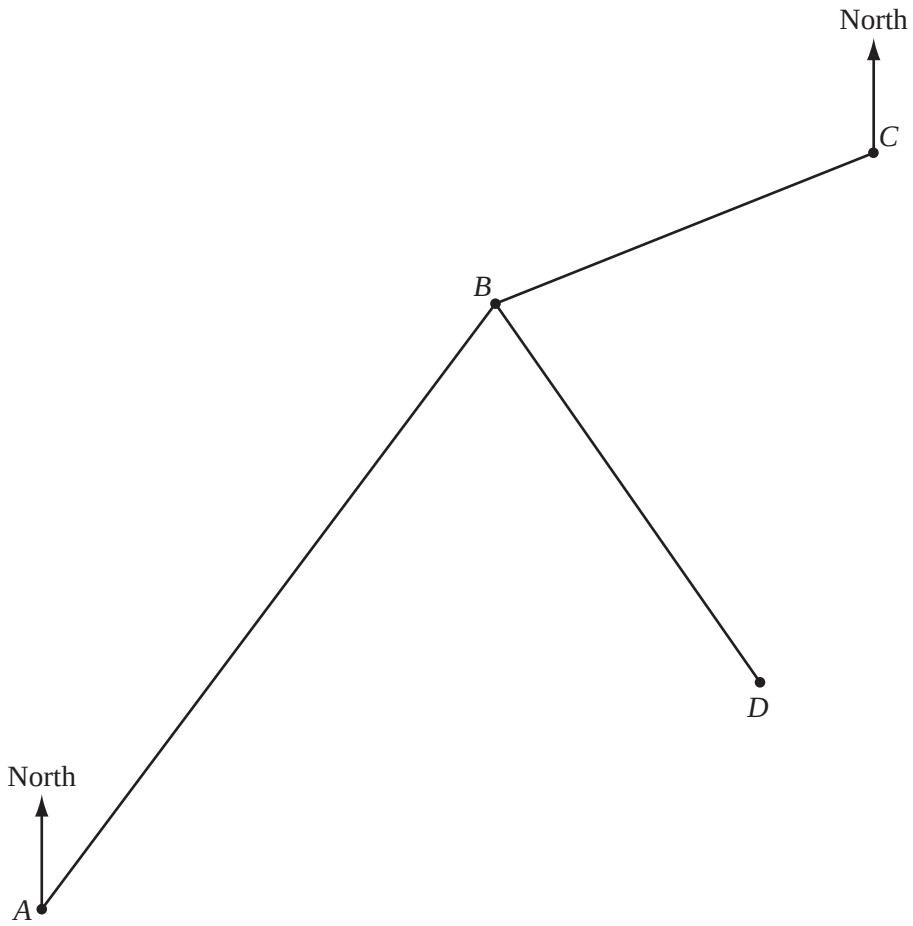
(ii) On the grid, draw the line $y = -x + 4$ for $-3 \leqslant x \leqslant 4$. [1]

(iii) Use both graphs to find the solutions of the equation $x^2 - 2x - 1 = -x + 4$.

Answer(c)(iii) x = ... or x = ... [2]

For Examiner's Use

5 (a)



Scale: 1 cm to 12 km

The diagram shows four towns, *A*, *B*, *C* and *D*, joined by straight roads *AB*, *BC* and *BD*. The scale is 1 centimetre represents 12 kilometres.

(i) Measure the bearing of *B* from *A*.

Answer(a)(i) ..... [1]

(ii) Work out the distance in kilometres from *A* to *B*.

Answer(a)(ii) ..... km [2]

(iii) Saraswati takes 1 hour 30 minutes to drive from *A* to *B*.

Calculate her average speed, in kilometres per hour, for this journey.

Answer(a)(iii) ..... km/h [1]

For Examiner's Use

(b) At *B*, Saraswati follows another straight road which is equidistant from *BC* and *BD*.

Using a straight edge and compasses only and leaving in all your construction lines, construct the line of this road on the diagram. [2]

(c) Another motorist, Leah, leaves *C* and drives on a bearing of 165° to meet Saraswati at town *E*. Town *E* is on the road in **part (b)**.

Show Leah's journey on the diagram and mark the town *E*. [1]

(d) Saraswati travelled from *B* to *E* at an average speed of 55 km/h.

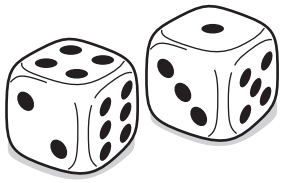
Calculate the time, in hours and minutes, that she took.

Answer(d) ..... h ..... min [4]

(e) There is a speed limit of 50 km/h on all roads within 30 km of town *D*.

On the diagram, show the boundary of the region where this speed limit applies. [2]

6



Felix rolls two fair dice, each numbered from 1 to 6, and adds the numbers shown.
He repeats the experiment 70 times and records the results in a frequency table.

The first 60 results are shown in the tally column of the table.
The last 10 results are 6, 8, 9, 2, 6, 4, 7, 9, 6, 10 .

Total	Tally	Frequency
2	𝍸	
3	𝍸	
4	𝍸 𝍸	
5	𝍸	
6	𝍸 𝍸	
7	𝍸 𝍸	
8	𝍸	
9	𝍸	
10	𝍸	
11	𝍸	
12	𝍸	

(a) (i) Complete the frequency table to show all his results. [2]

(ii) Write down the relative frequency of a total of 5.

Answer(a)(ii) ..... [1]

For Examiner's Use

(b) (i) Write down the mode.

Answer(b)(i) ..... [1]

(ii) Write down the range.

Answer(b)(ii) ..... [1]

(iii) Work out the median.

Answer(b)(iii) ..... [2]

(iv) Calculate the mean.

Answer(b)(iv) ..... [3]

(c) (i) Complete this table showing how different totals can be made when rolling two dice.

Dice 2 \ Dice 1	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6		
3						
4			7			
5		7		9		
6						12

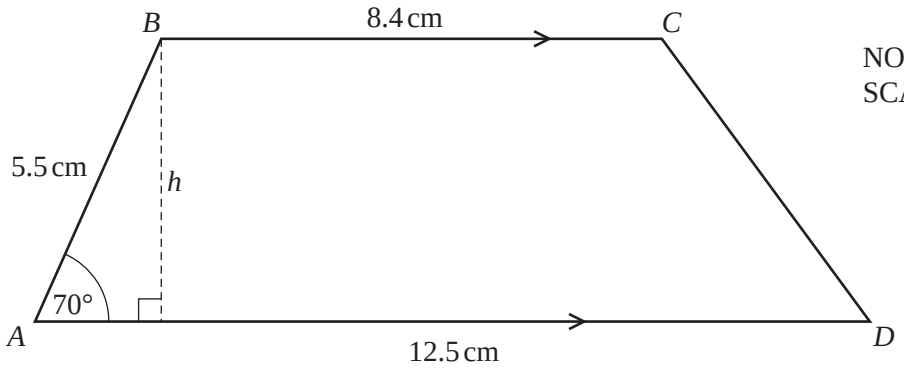
[1]

(ii) Explain why 7 is the most likely total.

Answer(c)(ii) ..... [1]

For Examiner's Use

7 (a)



In the quadrilateral *ABCD*, *BC* is parallel to *AD*.
AB = 5.5 cm, *BC* = 8.4 cm, *AD* = 12.5 cm and angle *BAD* = 70°.
The height of the quadrilateral is *h*.

(i) Write down the mathematical name of the quadrilateral *ABCD*.

Answer(a)(i) ..... [1]

(ii) Use trigonometry to show that $h = 5.2$ cm, correct to 1 decimal place.

Answer(a)(ii)

[2]

(iii) Calculate the area of the quadrilateral *ABCD*.

Answer(a)(iii) ..... cm^2 [2]

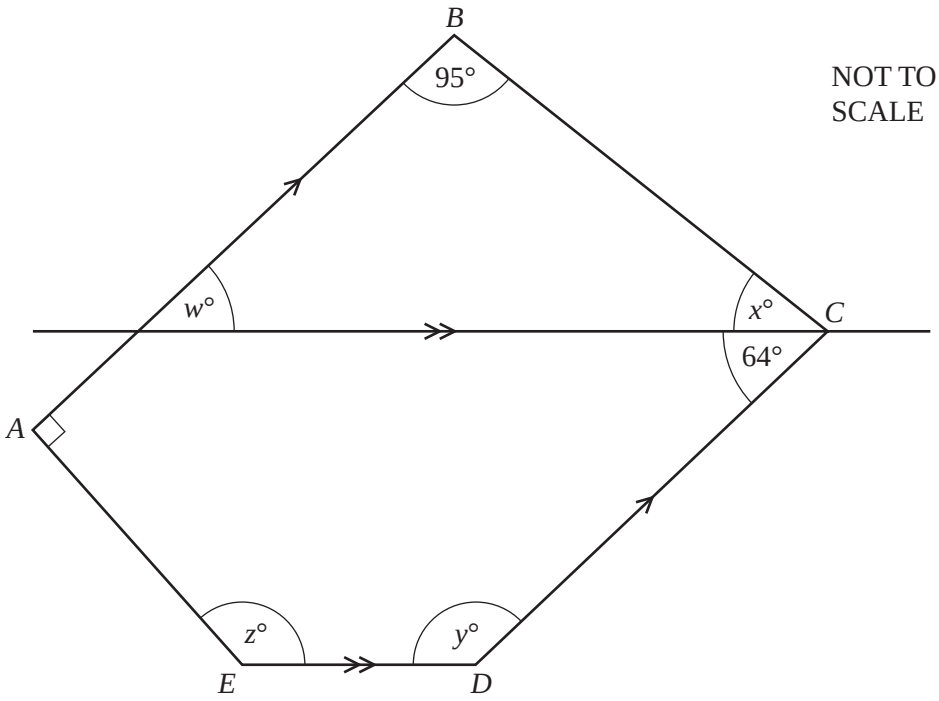
For Examiner's Use

(iv) The quadrilateral forms the cross section of a prism with length 6.8 cm.

Calculate the volume of the prism.
Give your answer correct to 2 significant figures.

Answer(a)(iv) ..... cm^3 [2]

(b)



The diagram shows a pentagon, *ABCDE*.
AB is parallel to *DC*.
A straight line, parallel to *ED*, passes through the vertex *C*.

(i) Find the values of *w*, *x* and *y*.

Answer(b)(i) *w* = ...

x = ...

y = ... [3]

(ii) The sum of the angles of a pentagon is 540°.

Find the value of *z*.

Answer(b)(ii) *z* = ... [2]

For Examiner's Use

8 **(a)** Simplify the following expressions.

(i) $3m - 5m + 6m$

Answer(a)(i) ..... [1]

(ii) $5e - 4f - 3e - 6f$

Answer(a)(ii) ..... [2]

(b) $s = u + at$

(i) Calculate the value of s when $u = 27$, $a = -2$ and $t = 15$.

Answer(b)(i) $s =$ ..... [2]

(ii) Make t the subject of the formula $s = u + at$.

Answer(b)(ii) $t =$ ..... [2]

(c) Solve the simultaneous equations.

$$5x + 2y = 4$$
$$4x - y = 11$$

Answer(c) $x =$ .....

$y =$ ..... [3]

For Examiner's Use

9 **(a)** Write down the next term and the rule for finding the next term for the following sequences.

(i) 3, 9, 27, 81, ...

Answer(a)(i) Next term ..... rule ..... [2]

(ii) 2, 3, 6, 11, 18, ...

Answer(a)(ii) Next term ..... rule ..... [2]

(iii) 4, 2, 1, $\frac{1}{2}$, ...

Answer(a)(iii) Next term ..... rule ..... [2]

(iv) 5, –10, 20, –40, ...

Answer(a)(iv) Next term ..... rule ..... [2]

(b) **(i)** Write down the next two terms of this sequence.

5, 13, 21, 29, ... , ... [2]

(ii) Write down the *n*th term of this sequence.

Answer(b)(ii) ..... [2]

(iii) Find the 100th term.

Answer(b)(iii) ..... [1]

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