

Surname	Centre Number	Candidate Number
Other Names		0



GCSE LINKED PAIR PILOT

4364/02

**METHODS IN MATHEMATICS
UNIT 2: Methods (Calculator)
HIGHER TIER**

A.M. THURSDAY, 17 January 2013

2 hours

ADDITIONAL MATERIALS

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** the questions in the spaces provided.
Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

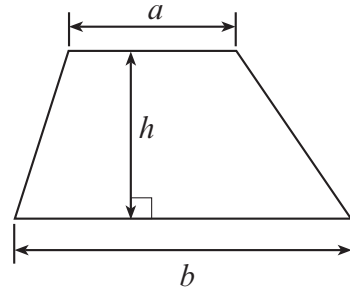
You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 6.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	10	
2	10	
3	6	
4	8	
5	7	
6	6	
7	6	
8	4	
9	5	
10	9	
11	5	
12	6	
13	3	
14	7	
15	8	
TOTAL MARK		

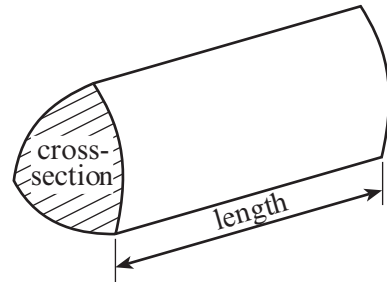
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Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$

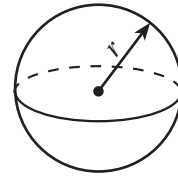


Volume of prism = area of cross-section \times length



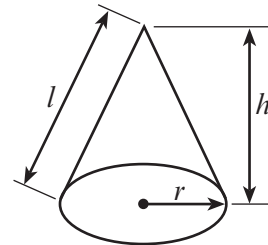
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

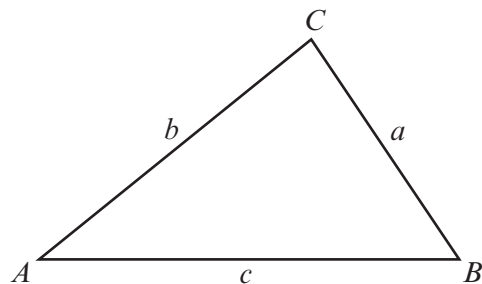


In any triangle ABC

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

1. (a) Write 281.6 as a percentage of 880.

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..... [2]

(b) Increase 640 by 35%.

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..... [2]

(c) Write 456050.8 correct to two significant figures.

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..... [1]

(d) Find the value of $\sqrt{\frac{1}{3 \cdot 2^2 + 2}}$ giving your answer correct to two decimal places.

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..... [3]

(e) Find the answer when $\frac{3}{8}$ of 40 is subtracted from 12.5.

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2. (a) Solve $\frac{2}{x} = 8$.

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..... [1]

(b) Solve $2(7x - 13) = 16$.

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..... [3]

(c) Solve $\frac{x + 4}{12} = 6$.

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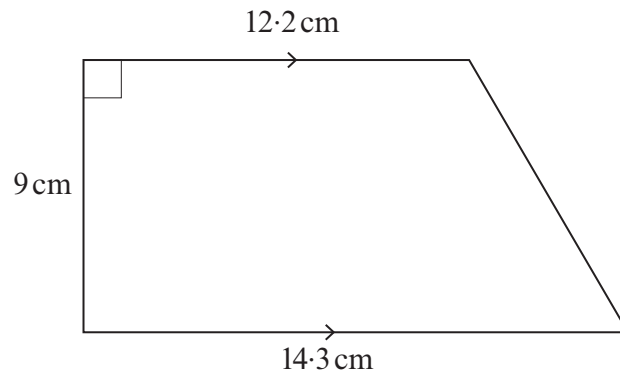
(d) Write down the greatest whole number that satisfies the inequality $5x < 34$.

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(e) Solve the inequality $3x - 4 < 26$.

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..... [2]

3. (a)

*Diagram not drawn to scale*

Calculate the area of the trapezium shown above giving the units for your answer.

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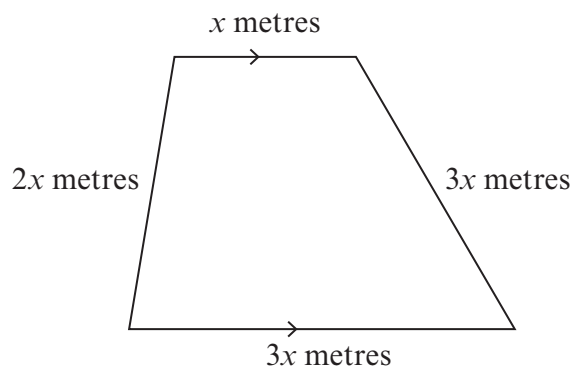
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[3]

(b)

*Diagram not drawn to scale*

The perimeter of this trapezium is 108 metres.
Find the length of each side of this trapezium.

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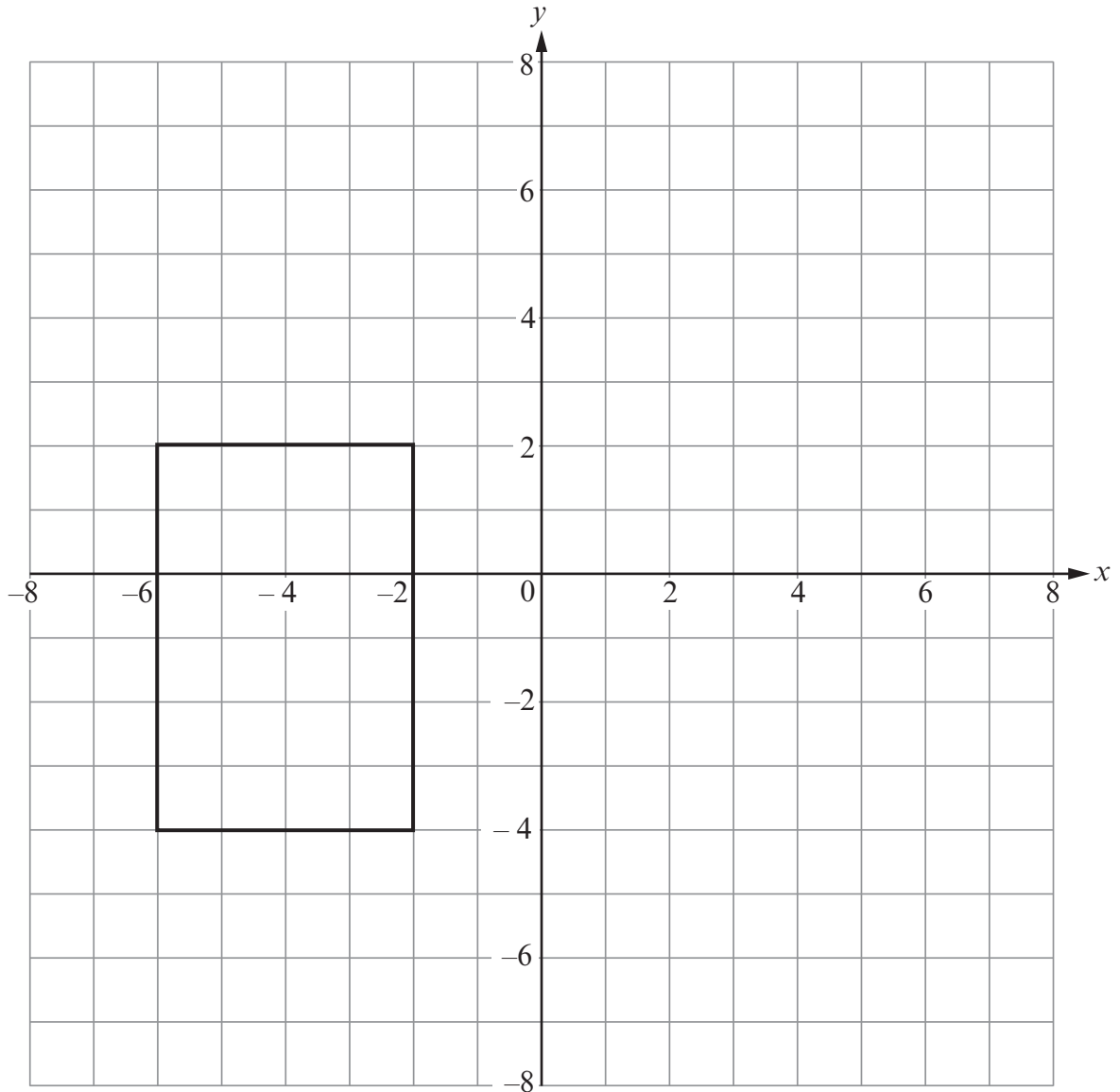
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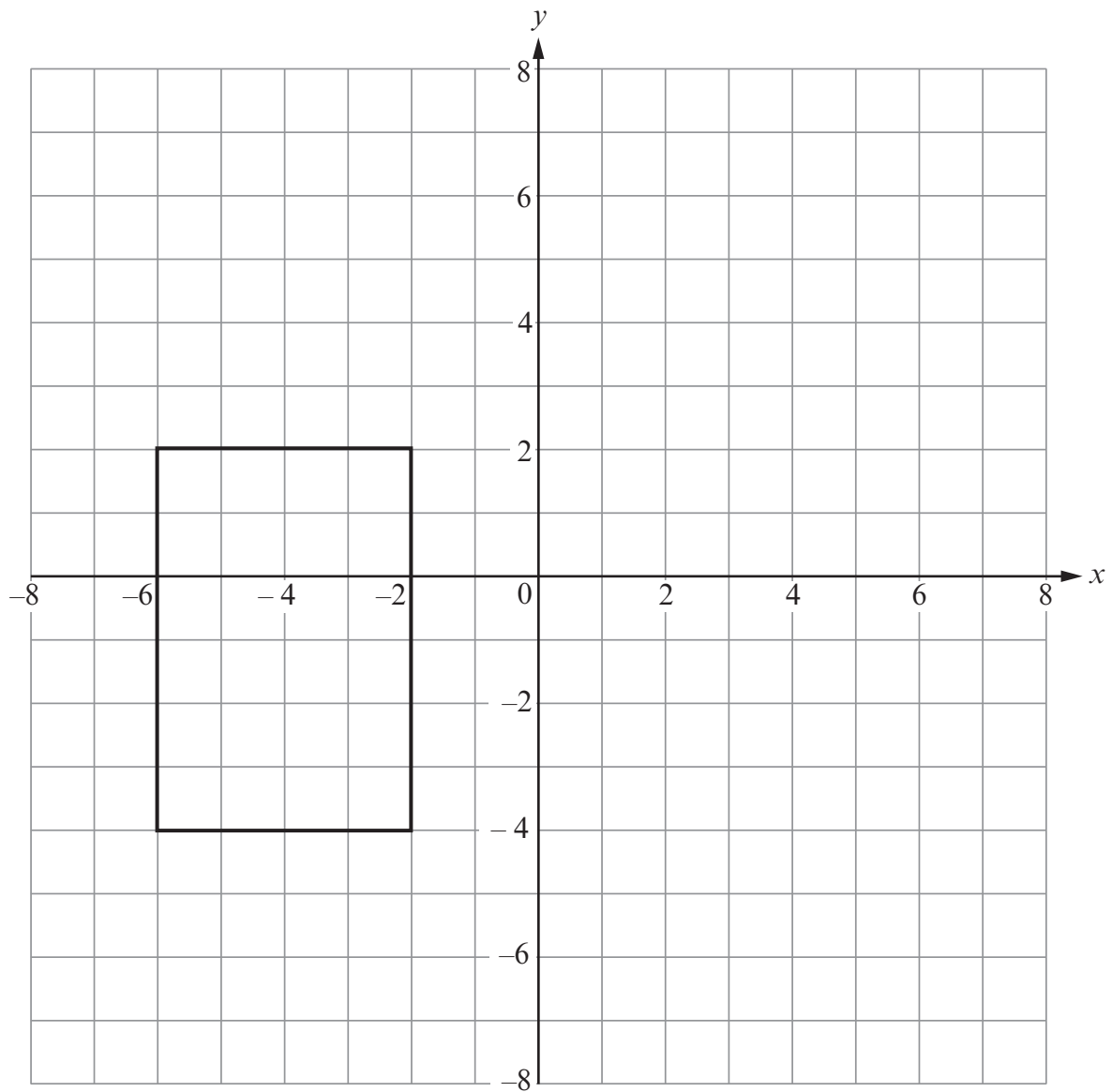
[3]

4. (a) Translate the rectangle shown below by $\begin{pmatrix} 2 \\ 4 \end{pmatrix}$.



[1]

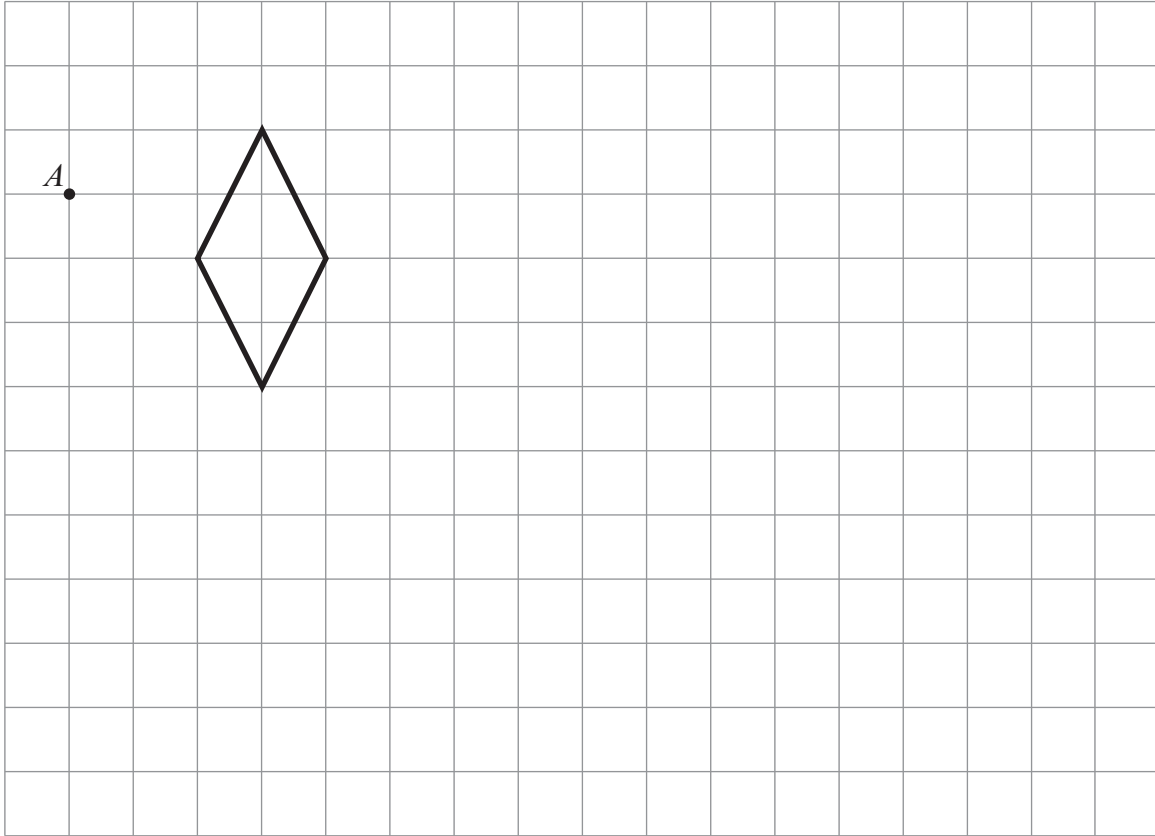
(b) Rotate the rectangle shown on the grid below through 90° clockwise about the origin.



[2]

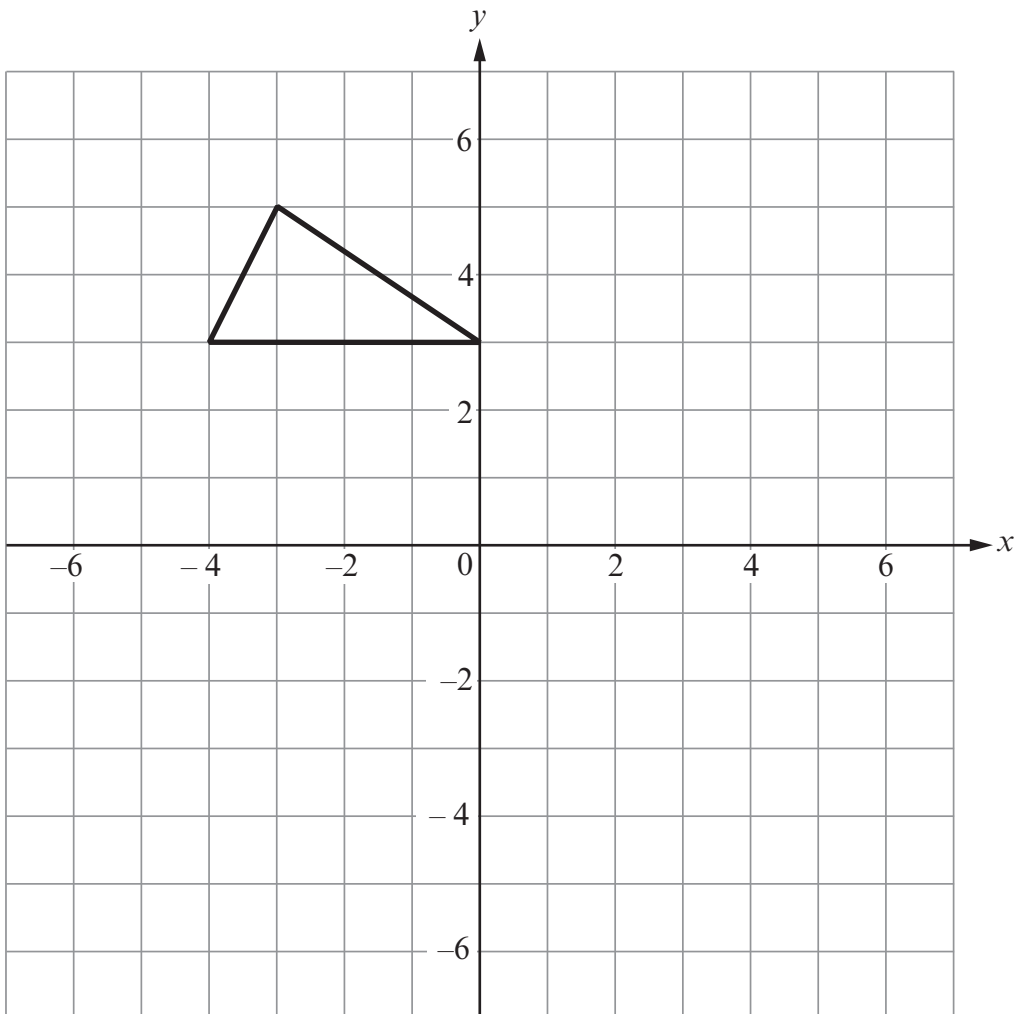
- (c) Enlarge the shape shown on the grid below by a scale factor of 2 using A as the centre of enlargement.

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[3]

(d) Reflect the triangle in the line $x = 1$.



[2]

5. (a)

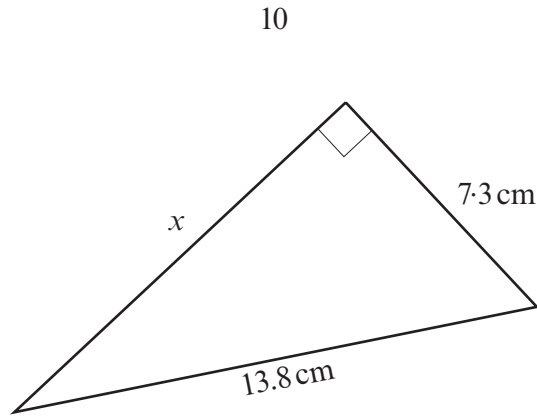


Diagram not drawn to scale

Calculate the length of the side marked x .

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[3]

(b)

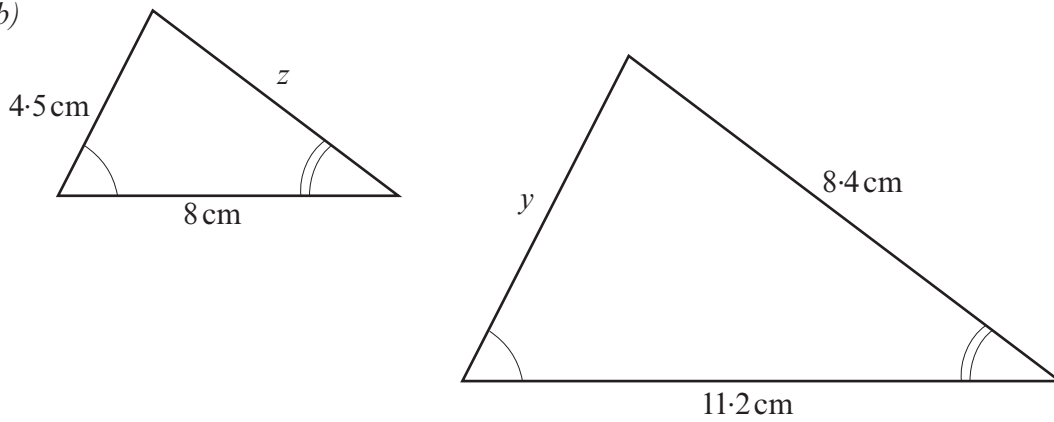


Diagram not drawn to scale

Calculate the lengths of the sides marked y and z .

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$y =$ cm $z =$ cm

[4]

6. *You will be assessed on the quality of your written communication in this question.*

Bradley makes the following statement.

‘The sum of any three consecutive numbers is always three times the middle number.’

Use algebra to prove Bradley’s statement is correct.

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[6]

7. On 1st January 2012 Jasmine weighed 84 kg and was overweight for her height. By eating healthy food and exercising, she lost 6% of her body weight during the first three months of 2012. Her weight then remained the same for the next two months. During June, Jasmine cycled every day and, by doing so, she lost 2.8% of her April body weight.

(a) Calculate Jasmine’s body weight at the end of June.

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[4]

(b) What percentage of her original body weight did Jasmine lose in these six months?

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[2]

8. A rectangular tile is to be made so that the sum of its length and width must be 8 cm.
Draw a graph to show possible dimensions of this tile.

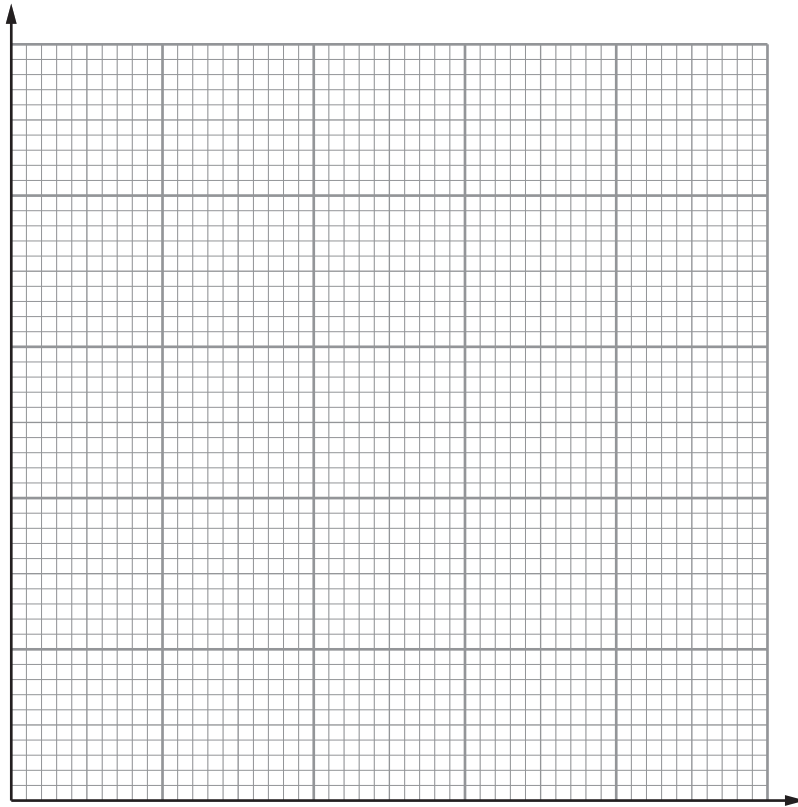
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[4]



9. (a) A measurement has been increased by 26%.
After the increase the measurement is 57.96 cm.
Calculate the original measurement.

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[3]

- (b) Calculate the sum of 2.31×10^{14} , 3.48×10^{12} and 6.8×10^{13} .
Give your answer in standard form correct to 3 significant figures.

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[2]

10. The diagram below shows a rectangle $ABCD$.

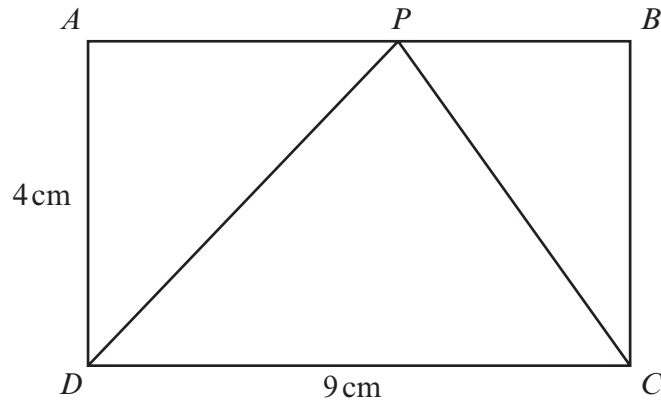


Diagram not drawn to scale

The point P is on the side AB .
The ratio of AP to PB is $3:2$.

(a) Calculate the area of the triangle DPC .

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[2]

(b) Calculate the size of \hat{PDC} .

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[7]

11. A 3D shape is made using see-through plastic.
A right circular cone fits exactly into a hemisphere as shown in the diagram.
The gap between the interlocking cone and hemisphere is filled with coloured gel.
The radii of the cone and hemisphere are both 10 cm.

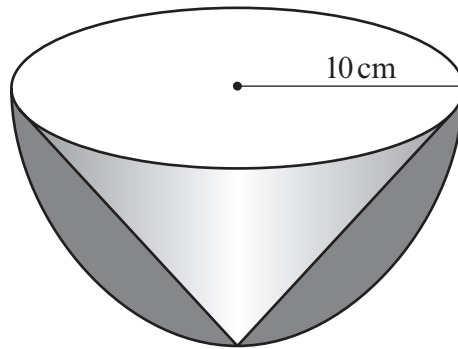


Diagram not drawn to scale

Calculate the volume of the coloured gel.

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[5]

12. (a)

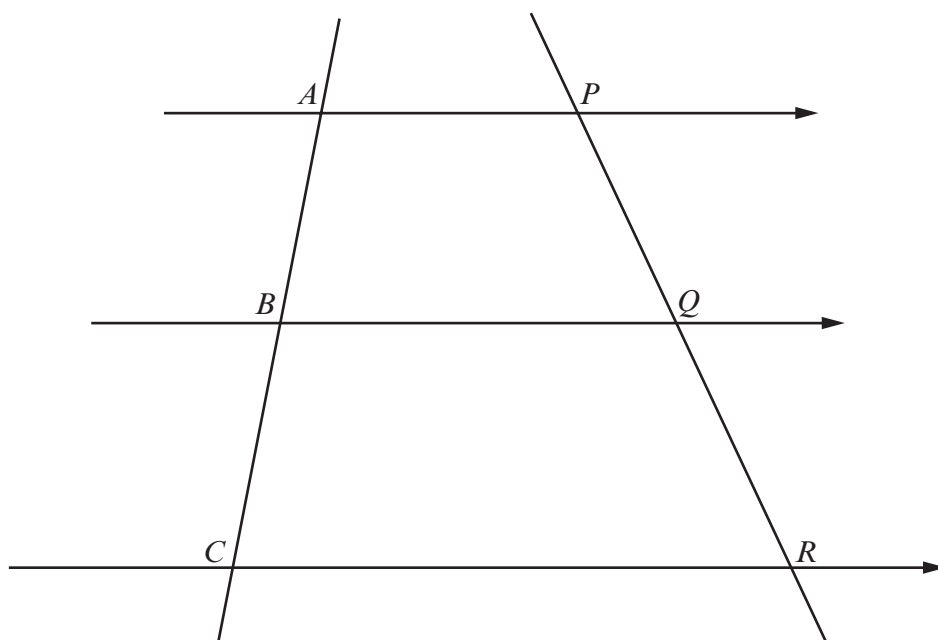


Diagram not drawn to scale

You are given that $AB = 3$ cm, $BC = 5$ cm and $PQ = 4.5$ cm.
Calculate the length of PR .

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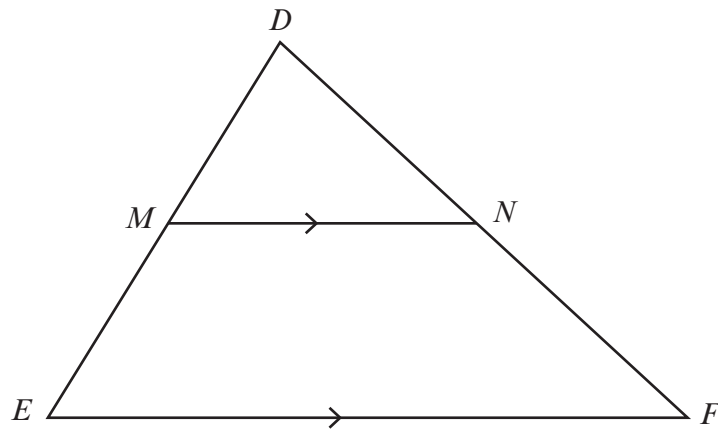
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[3]

(b)

*Diagram not drawn to scale*

You are given that $DM = 3x$ cm, $DF = 5y$ cm, $EF = 9y$ cm and that M is the mid-point of DE . Find the perimeter of triangle DMN in terms of x and y . Give your answer in its simplest form.

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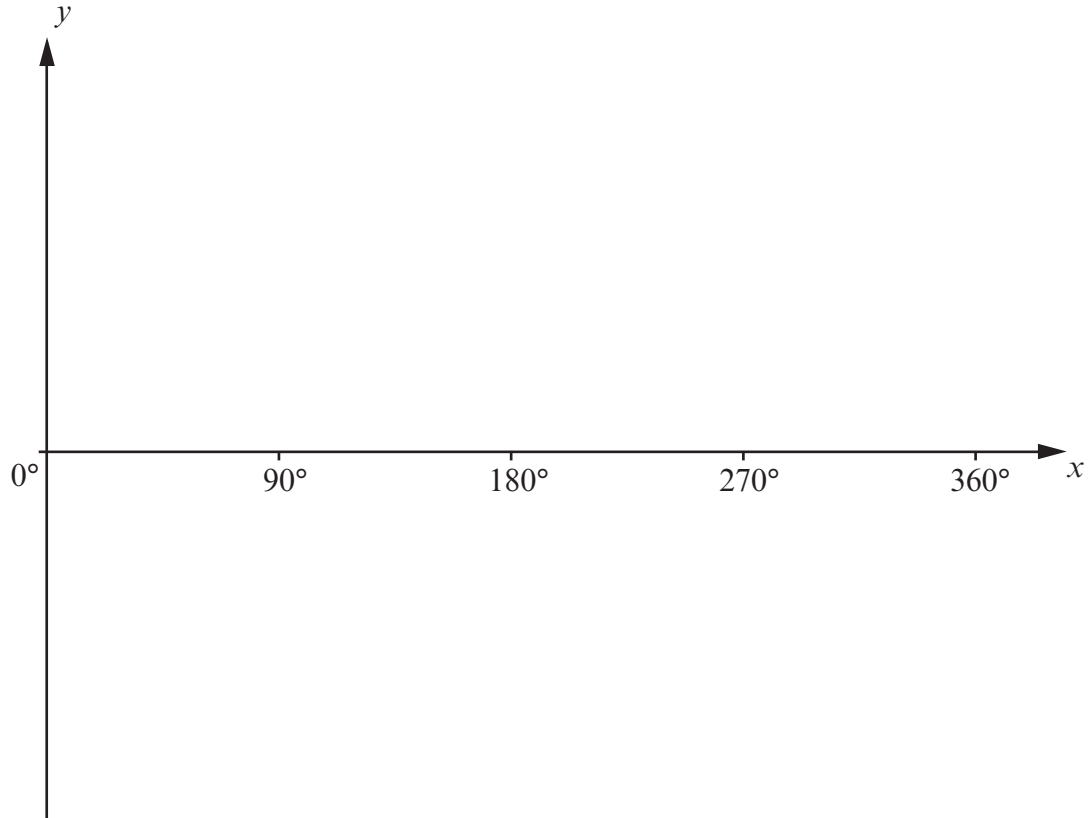
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13. Use the axes given below to sketch the graph of $y = \tan x$ for values of x from 0° to 360° .



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[3]

14.

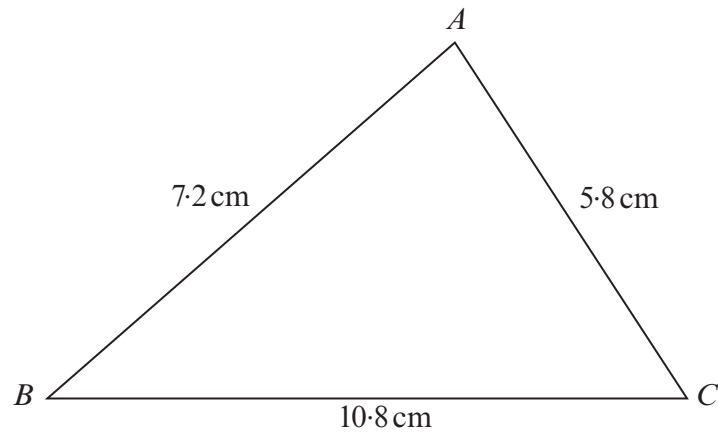


Diagram not drawn to scale

(a) Calculate the size of \hat{BAC} .

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[4]

(b) Calculate the area of triangle ABC .

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15. A rectangle of length $(x + 8)$ cm and width x cm has an area of y cm².
It is known that $y - x = 1284$.
Find the dimensions of the rectangle.
Give your answer correct to 1 decimal place.
You must use an algebraic method.

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