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Centre Number												Candidate Number										
Candidate Signature																						

For Examiner's Use

General Certificate of Secondary Education
November 2007



MATHEMATICS (MODULAR) (SPECIFICATION B)
Module 5 Intermediate Tier
Paper 1 Non-Calculator

33005/I1

Tuesday 6 November 2007 9.00 am to 10.15 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not use a calculator.</p>	
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For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
TOTAL	
Examiner's Initials	

Time allowed: 1 hour 15 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

Advice

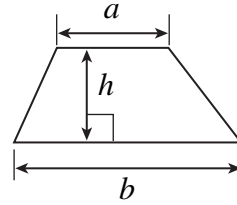
- In all calculations, show clearly how you work out your answer.



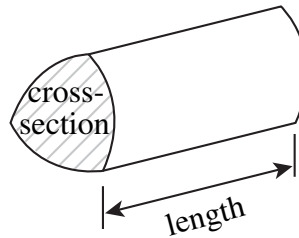
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



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



Answer **all** questions in the spaces provided.

1 (a) Write down the value of

(i) 5^2

Answer (1 mark)

(ii) 5^3

Answer (1 mark)

(b) Here is a sequence of numbers.

121 144 169 196 225

Write down the special name for these numbers.

Answer (1 mark)

(c) Here is a sequence of cube numbers.

1 8 27 64 125

Explain how you could work out the next cube number.
You do not have to work out the answer.

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.....
(1 mark)

Turn over for the next question

Turn over ►



2 Here is a pattern of squares.

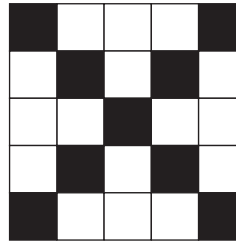
Pattern 1



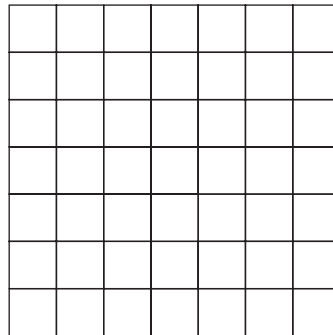
Pattern 2



Pattern 3



(a) Draw the next pattern on the grid.



(1 mark)

(b) Here is a method for working out the number of black squares in each pattern.

$$\text{Pattern 1} \quad 1 + 4 \times 0 = 1$$

$$\text{Pattern 2} \quad 1 + 4 \times 1 = 5$$

$$\text{Pattern 3} \quad 1 + 4 \times 2 = 9$$

$$\text{Pattern 4} \quad 1 + 4 \times 3 = 13$$

Complete the method for Pattern 10.

$$\text{Pattern 10} \quad 1 + \dots\dots\dots = \dots\dots$$

(2 marks)



(c) Which of the following statements is true?

- A Pattern 12 has 39 black squares.
- B The number of black squares is always odd.
- C Every pattern has more black squares than green squares.

Answer (1 mark)

(d) Pattern n has $4n - 3$ black squares.

Which pattern has 101 black squares?

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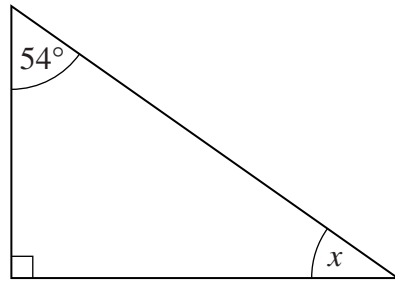
Answer (2 marks)

Turn over for the next question

Turn over ►



- 3 (a) The diagram shows a right-angled triangle.



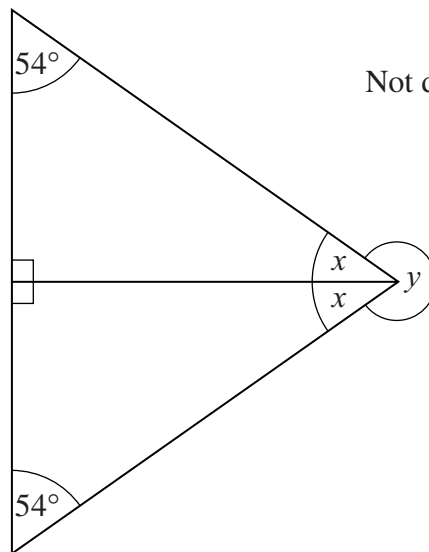
Not drawn accurately

Work out the value of x .

.....

Answer degrees (1 mark)

- (b) Two congruent right-angled triangles are joined together to form an isosceles triangle as shown.



Not drawn accurately

Work out the value of y .

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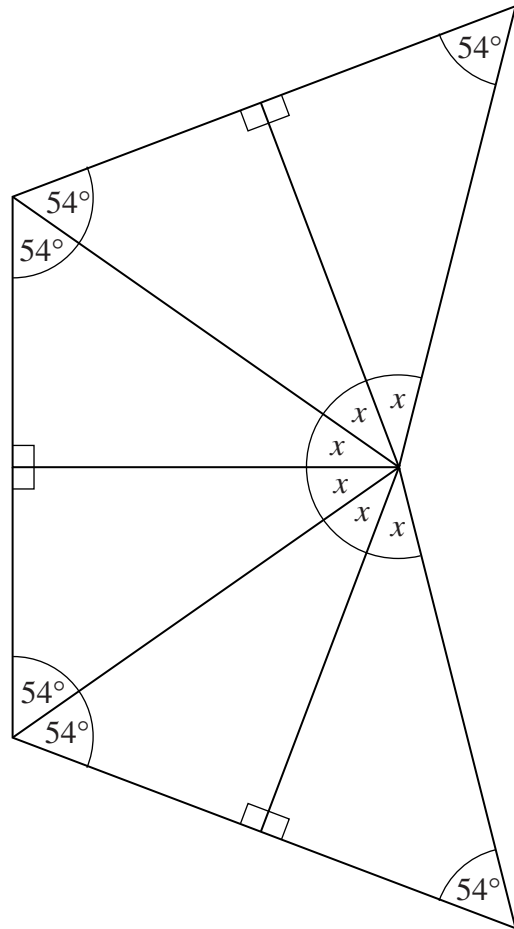
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Answer degrees (3 marks)



- (c) Pairs of the right-angled triangles are fitted together to make a regular polygon. Part of the regular polygon is shown.



Not drawn accurately

How many right-angled triangles will there be in the regular polygon?
You **must** show your working.

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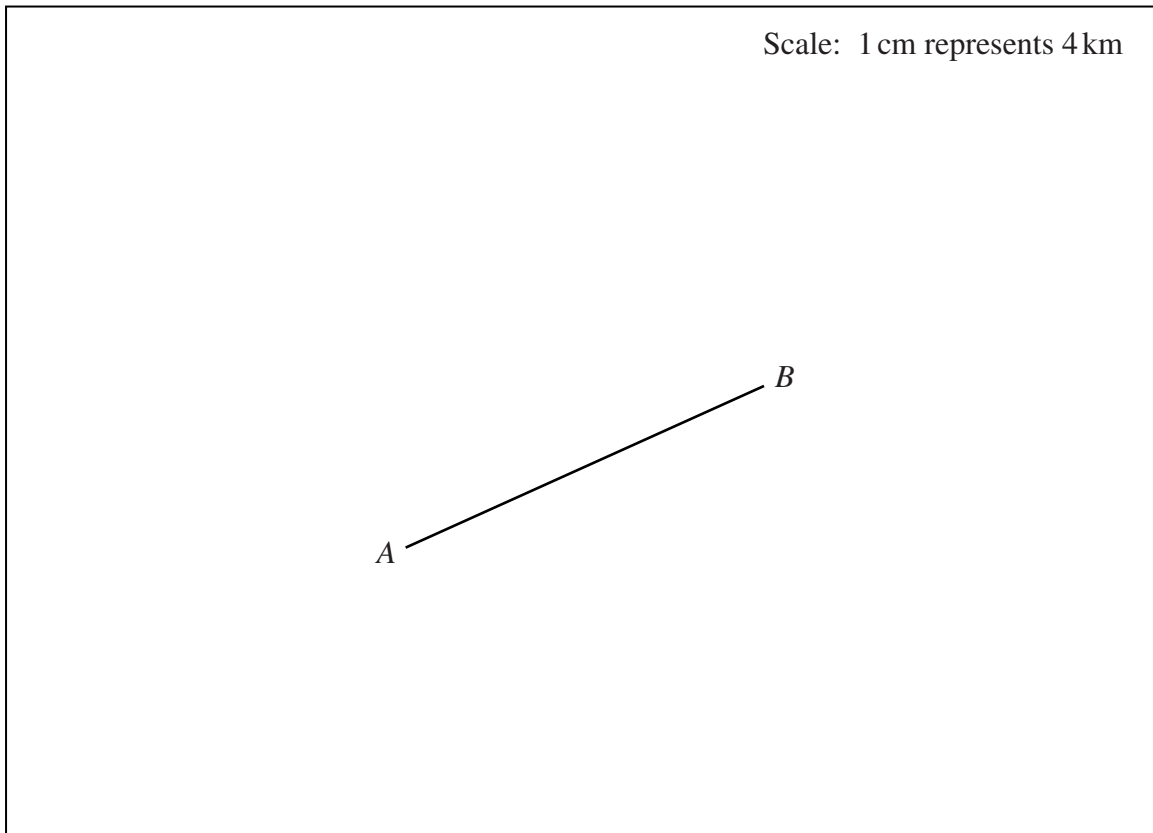
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Answer (2 marks)

Turn over ►



- 4 The positions of towns *A* and *B* are shown on the diagram.
The diagram is drawn to scale.
1 cm represents 4 km.



- (a) Work out the actual distance between towns *A* and *B*.

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Answer km (3 marks)

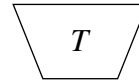
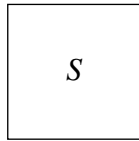
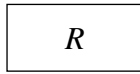
- (b) A town *C* is 16 kilometres from *A* and 16 kilometres from *B*.

Using compasses only, mark the **two** possible positions of *C* on the diagram.

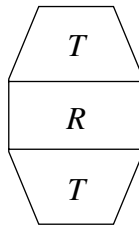
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 (2 marks)



5 All areas in this question are in square centimetres.
Here is a rectangle of area R , a square of area S and a trapezium of area T .



(a) The area of the shape below is given by $A = R + 2T$

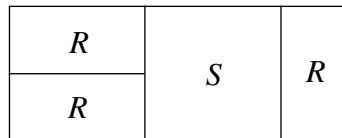


Find the value of A when $R = 7.5$ and $T = 6.3$

.....
.....

Answer (2 marks)

(b) Here is a different shape.



(i) Write down an expression for the area of this shape.

Answer (1 mark)

(ii) Which of the following is correct?
Circle your answer.

$3R = S$

$2R = S$

$R = 2S$

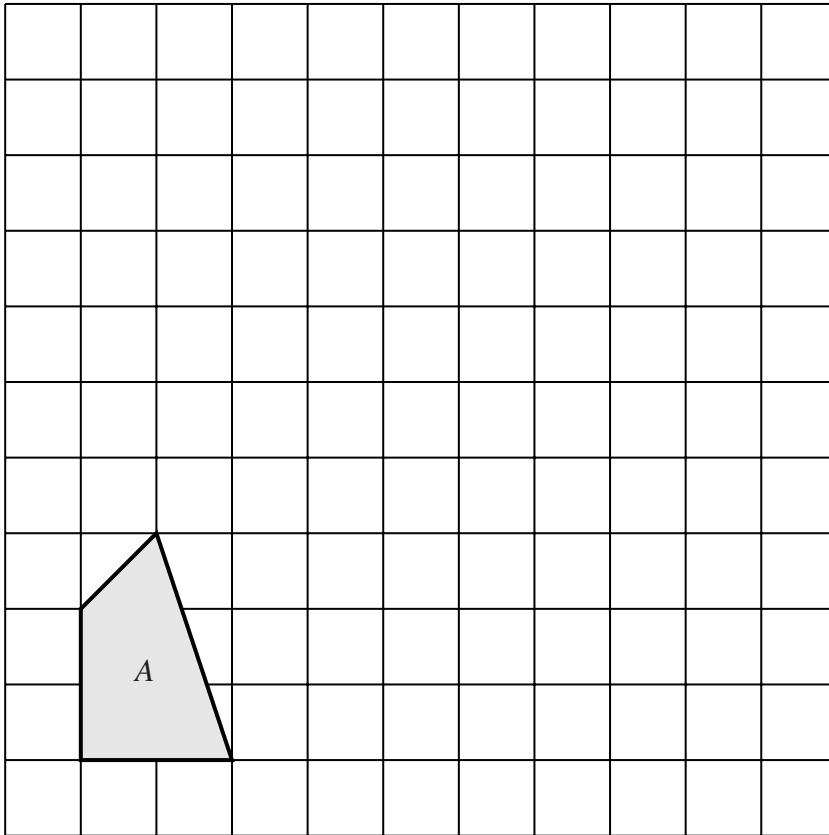
$R = 3S$

(1 mark)

Turn over ►



6 Enlarge shape A by scale factor 3.



(2 marks)



7 (a) Solve $4x - 7 = 9$

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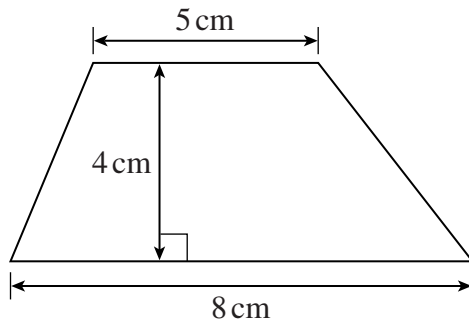
Answer $x =$ (2 marks)

(b) Solve $5(3y + 4) = 50$

.....
.....
.....

Answer $y =$ (3 marks)

8 The diagram shows a trapezium.



Not drawn accurately

Work out the area of the trapezium.

.....
.....

Answer cm^2 (2 marks)

Turn over ►



9 (a) Complete the statement.

1 gallon is approximately equal to litres

(1 mark)

(b) A container holds 5 gallons of oil.

Convert 5 gallons to litres.

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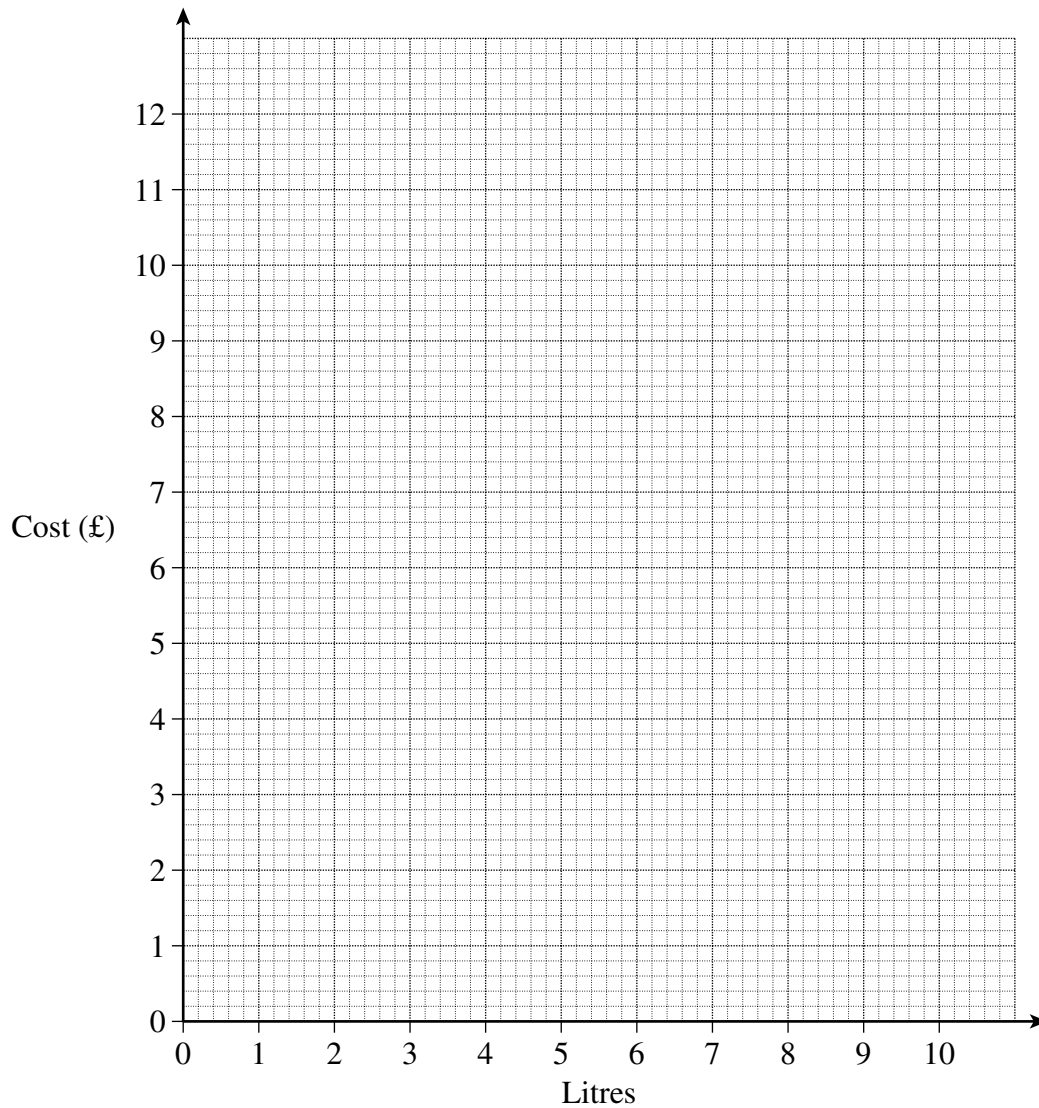
Answer litres

(2 marks)



(c) Fuel costs £1.20 per litre.

(i) Draw a graph to show this information.



(2 marks)

(ii) Work out the number of litres that can be bought for £25.
Give your answer as a whole number of litres.

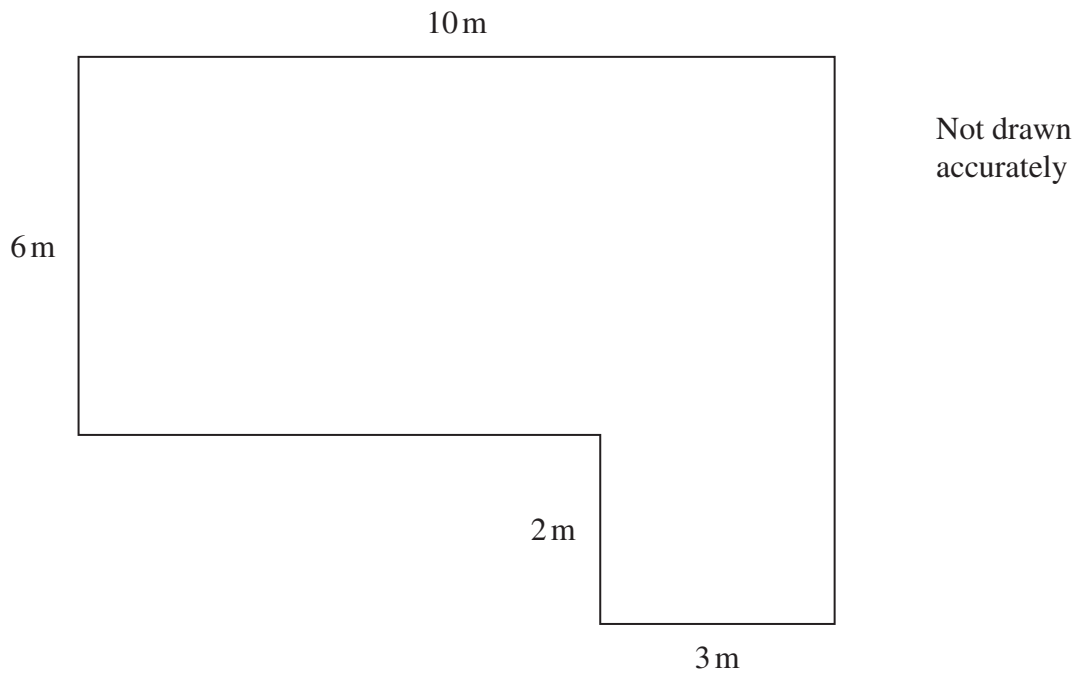
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Answer litres (2 marks)

Turn over ►



- 10 The diagram shows the plan of the floor of a room.



- (a) Work out the perimeter of the floor.

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Answer m (2 marks)

- (b) (i) Work out the area of the floor.
State the units of your answer.

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Answer (4 marks)



(ii) A roll of plain carpet is 3 metres wide.

Work out the minimum length of carpet needed to cover the floor.

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Answer m (2 marks)

Turn over for the next question

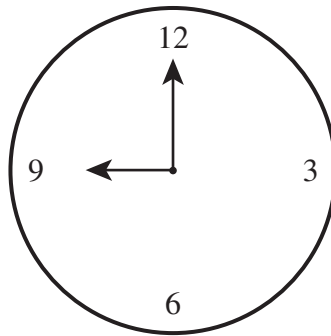


11 (a) Make a the subject of the formula $c^2 = a^2 + b^2$

.....

Answer (2 marks)

(b) The hour hand of a clock is 7 cm long.
 The minute hand is 10 cm long.



Work out the distance between the tips of the hands at 9 o'clock.
 Leave your answer as a square root.

.....

Answer cm (3 marks)



12 (a) Solve $\frac{18}{z} = 1.5$

.....

Answer $z =$ (1 mark)

(b) Simplify $x^3 \times x^2$

Answer (1 mark)

(c) Simplify $y^2 \div y$

Answer (1 mark)

(d) Simplify fully $\frac{18x^5y^2}{12x^2y}$

.....

Answer (2 marks)

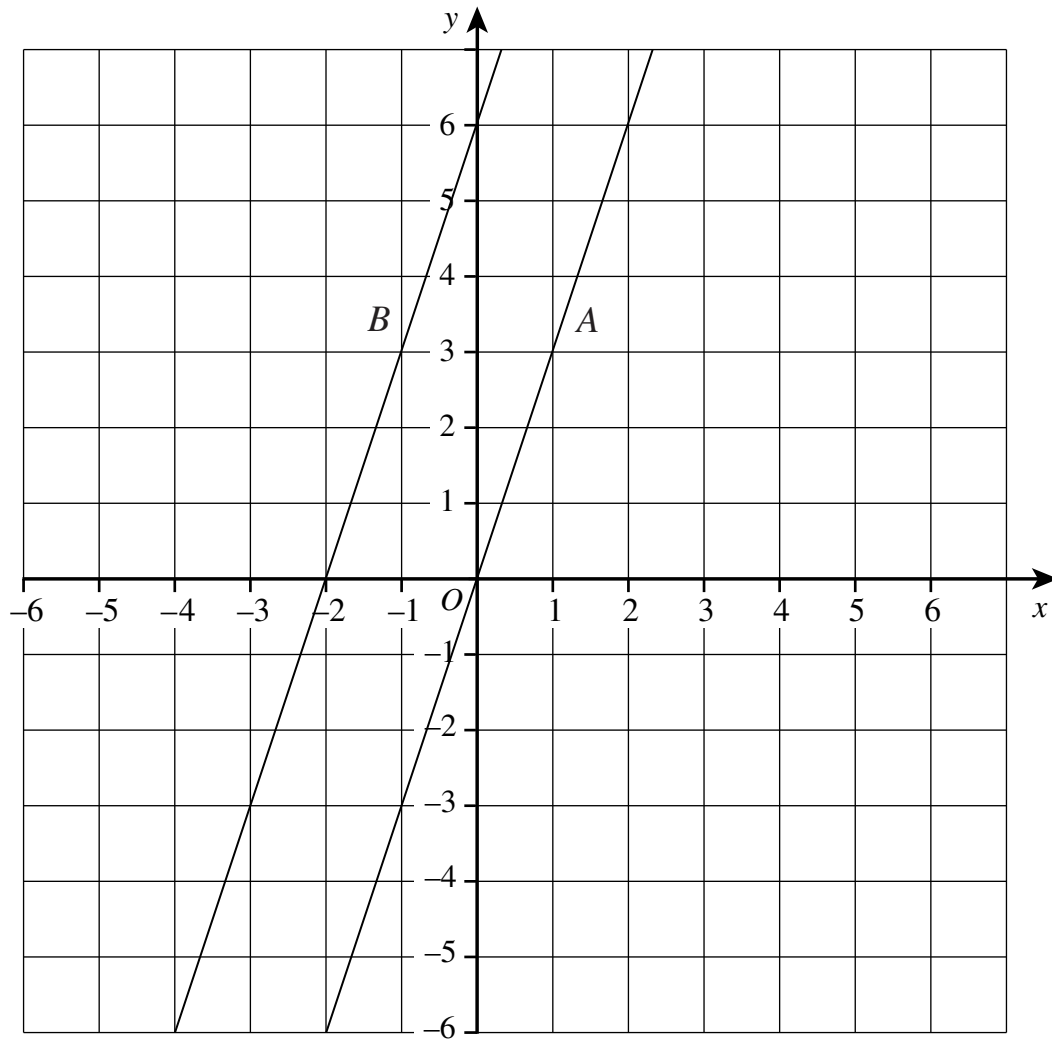
(e) Factorise fully $18x^5y^2 - 12x^2y$

.....

Answer (3 marks)



13 The grid shows the graphs of two straight lines *A* and *B*.



(a) Write down the equation of line *A*.

.....

Answer (2 marks)

(b) Write down the equation of line *B*.

.....

Answer (1 mark)

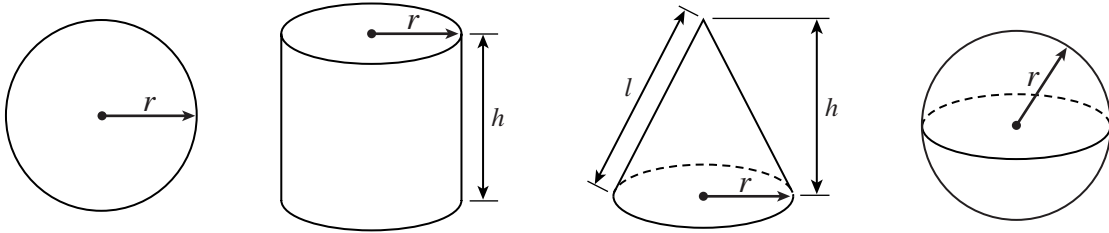
(c) Write down a fact about the gradients of lines *A* and *B*.

Answer

(1 mark)



14 A circle, a cylinder, a cone and a sphere are shown.



Here are some expressions for these shapes.

For each expression, state whether it represents a length, an area or a volume.

(a) $2\pi r$

Answer (1 mark)

(b) $\pi r^2 h$

Answer (1 mark)

(c) $\pi r l$

Answer (1 mark)

(d) $\frac{4}{3}\pi r^3$

Answer (1 mark)

END OF QUESTIONS



There are no questions printed on this page

