Surname		Other Names	
Centre Number			Candidate Number					
Candidate Signature									

For Examiner's Use

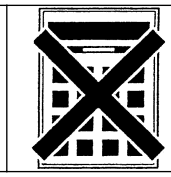
General Certificate of Secondary Education
November 2007

MATHEMATICS (MODULAR) (SPECIFICATION B) 33005/I1
Module 5 Intermediate Tier
Paper 1 Non-Calculator

Tuesday 6 November 2007 9.00 am to 10.15 am

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



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

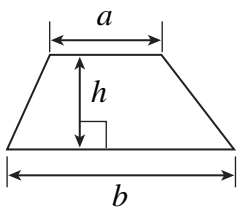
- In all calculations, show clearly how you work out your answer.

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	

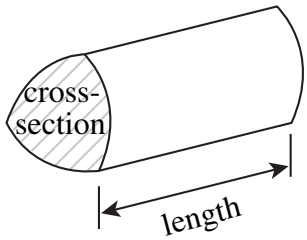
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



Volume of prism = area of cross-section × 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.

.....

.....

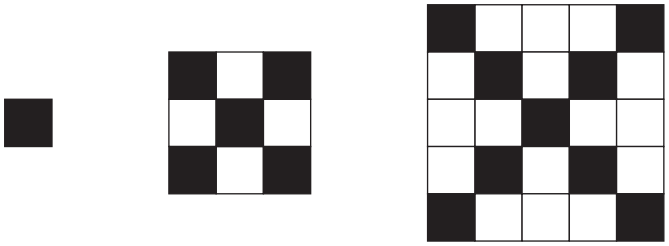
(1 mark)

Turn over for the next question

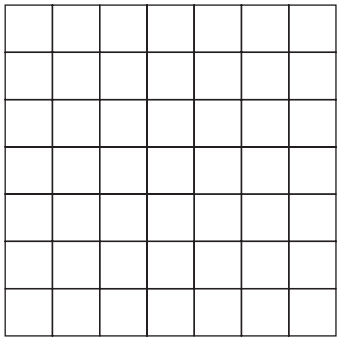
4

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.

Pattern 1 $1 + 4 \times 0 = 1$
Pattern 2 $1 + 4 \times 1 = 5$
Pattern 3 $1 + 4 \times 2 = 9$
Pattern 4 $1 + 4 \times 3 = 13$

Complete the method for Pattern 10.

Pattern 10 $1 +$ …… $=$ ……

(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?

.....

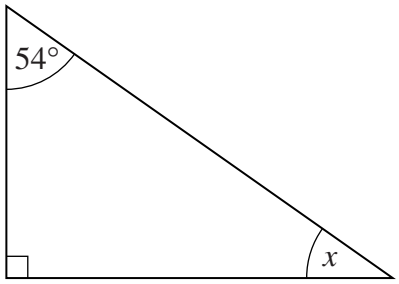
.....

Answer ..... *(2 marks)*

Turn over for the next question

6

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



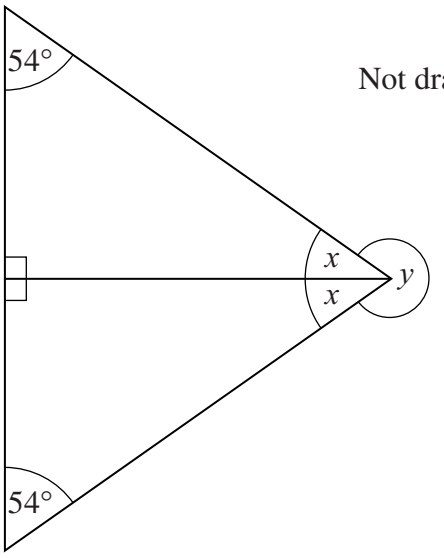
Not drawn accurately

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.

.....

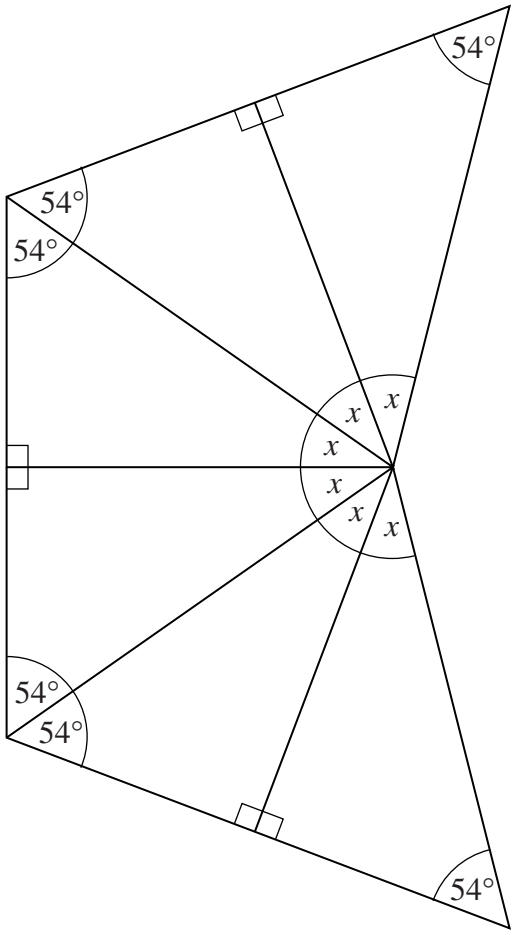
.....

.....

.....

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.

.....

.....

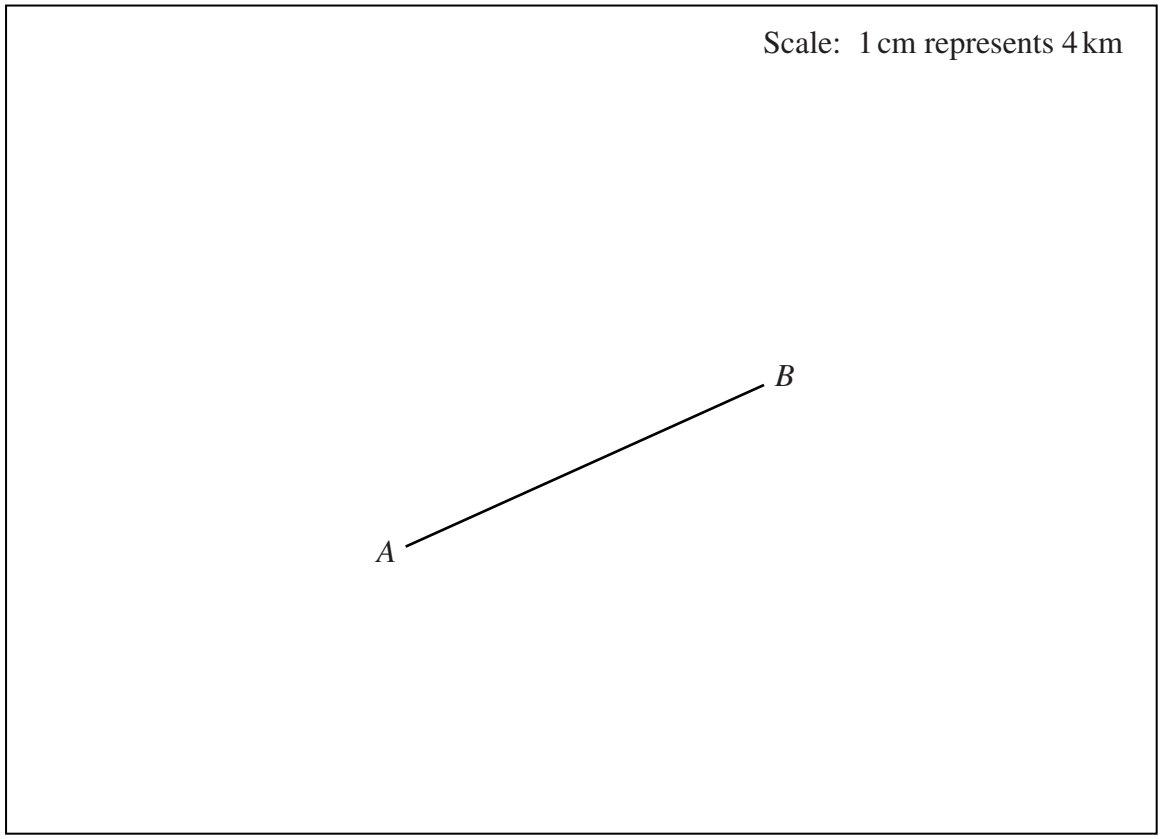
.....

.....

Answer ..... *(2 marks)*

6

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*.

.....

.....

.....

Answer ..... km *(3 marks)*

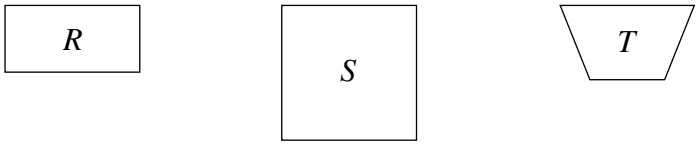
(b) A town *C* is 16 kilometres from *A* and 16 kilometres from *B*.

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

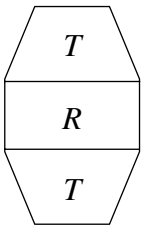
.....

(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 $A = R + 2T$



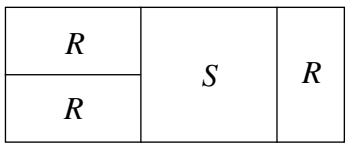
Find the value of A when $R = 7.5$ and $T = 6.3$

.....

.....

Answer ..... *(2 marks)*

(b) Here is a different shape.



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

Answer ..... *(1 mark)*

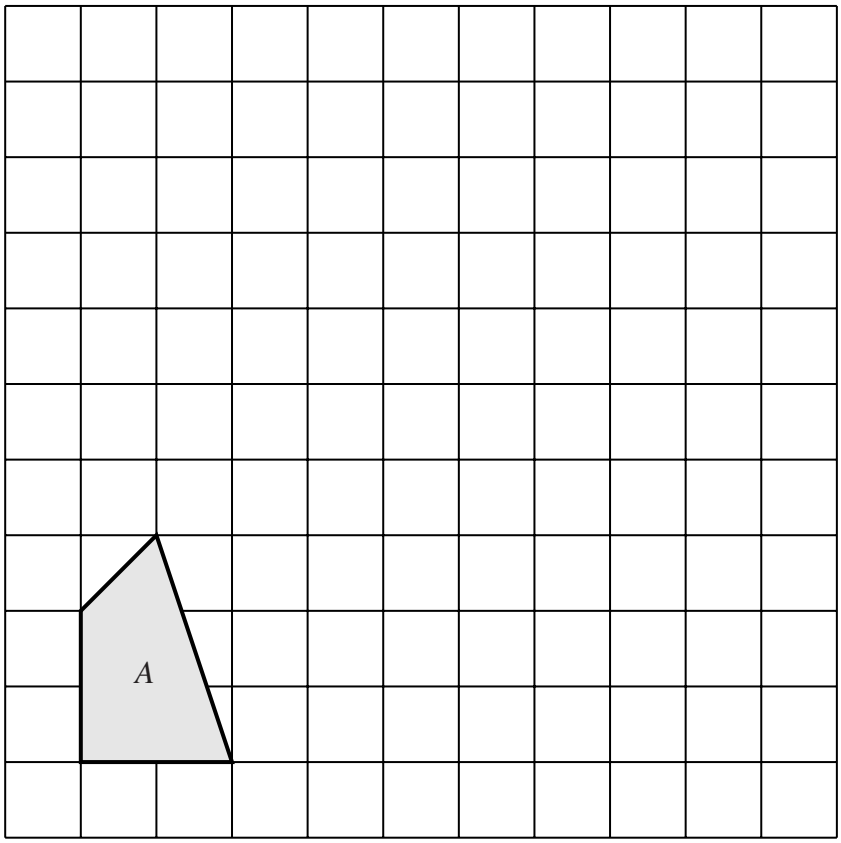
(ii) Which of the following is correct?
Circle your answer.

$3R = S$ $\quad$ $2R = S$ $\quad$ $R = 2S$ $\quad$ $R = 3S$

(1 mark)

9

6 Enlarge shape *A* by scale factor 3.



(2 marks)

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

.....

.....

Answer $x =$ ..... *(2 marks)*

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

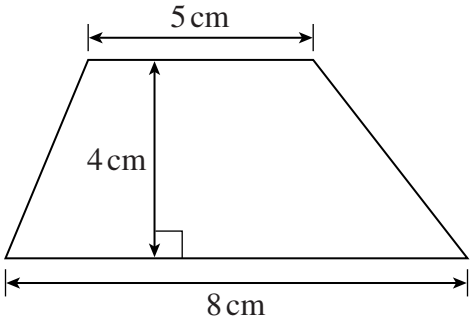
.....

.....

.....

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)*

9

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.

.....

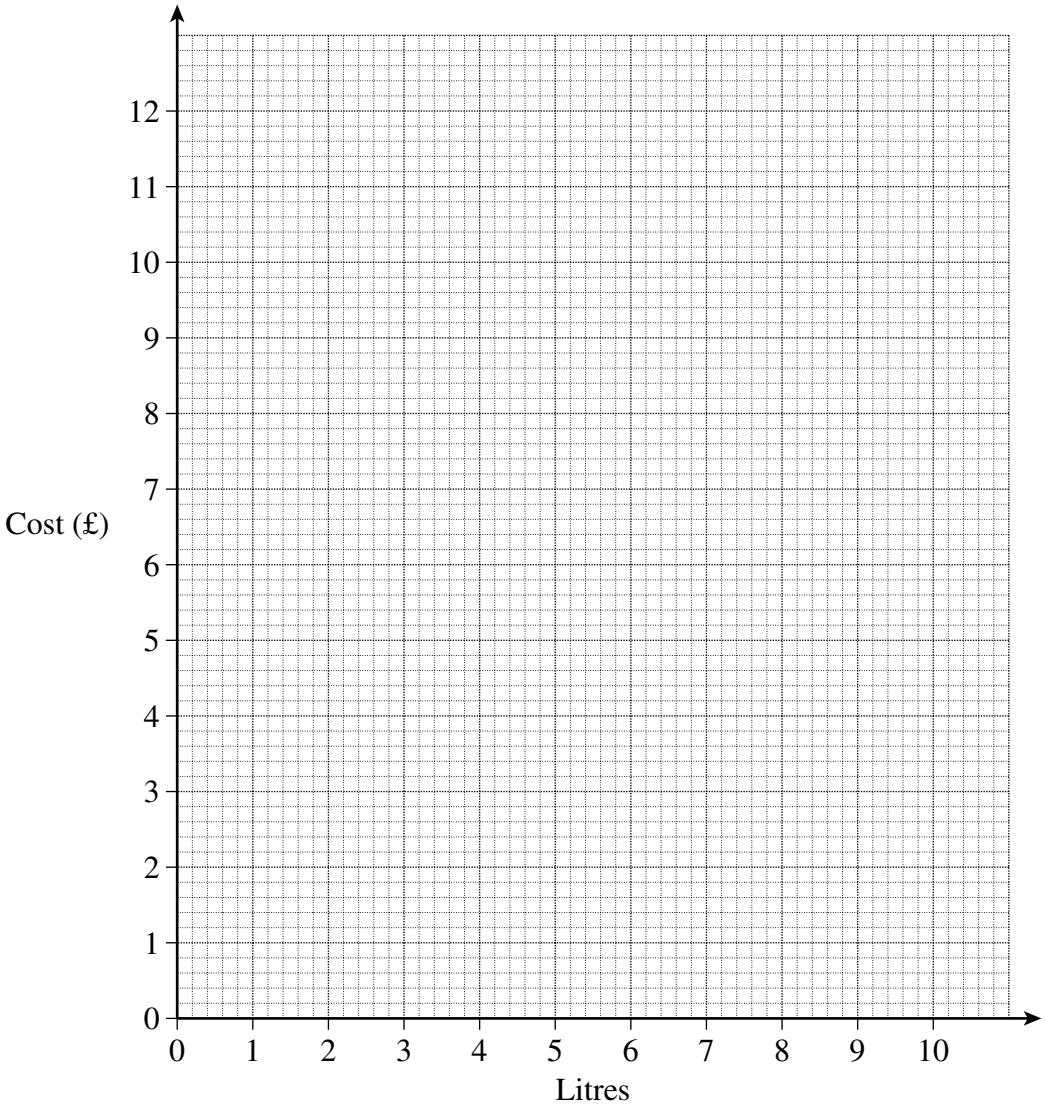
.....

.....

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.

.....

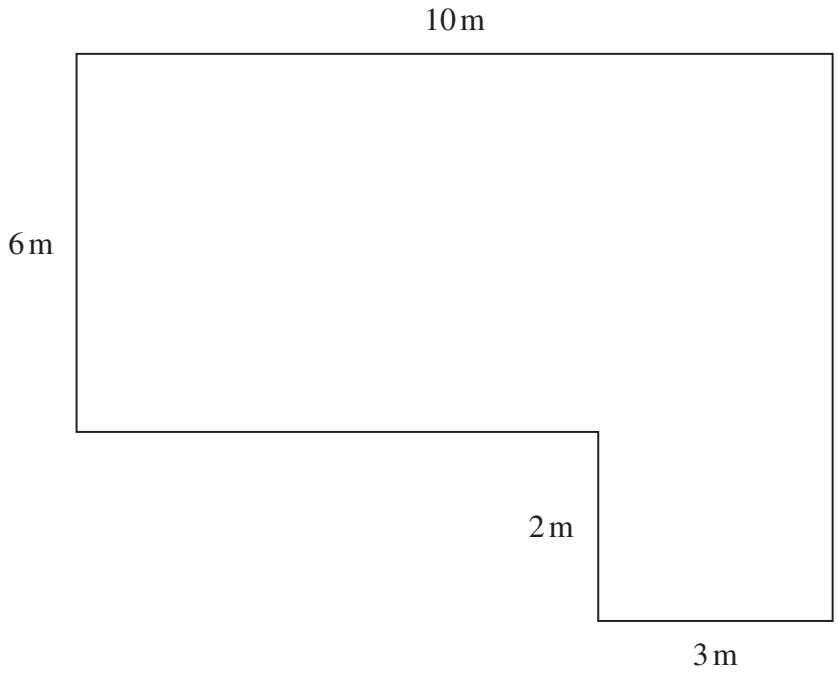
.....

Answer ..... litres *(2 marks)*

7

Turn over ▶

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



Not drawn accurately

(a) Work out the perimeter of the floor.

.....

.....

.....

Answer ..... m *(2 marks)*

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

.....

.....

.....

.....

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.

.....

.....

.....

.....

Answer ..... m *(2 marks)*

Turn over for the next question

8

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

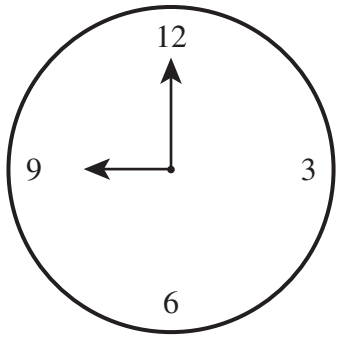
.....

.....

.....

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 $18x^5y^2 - 12x^2y$

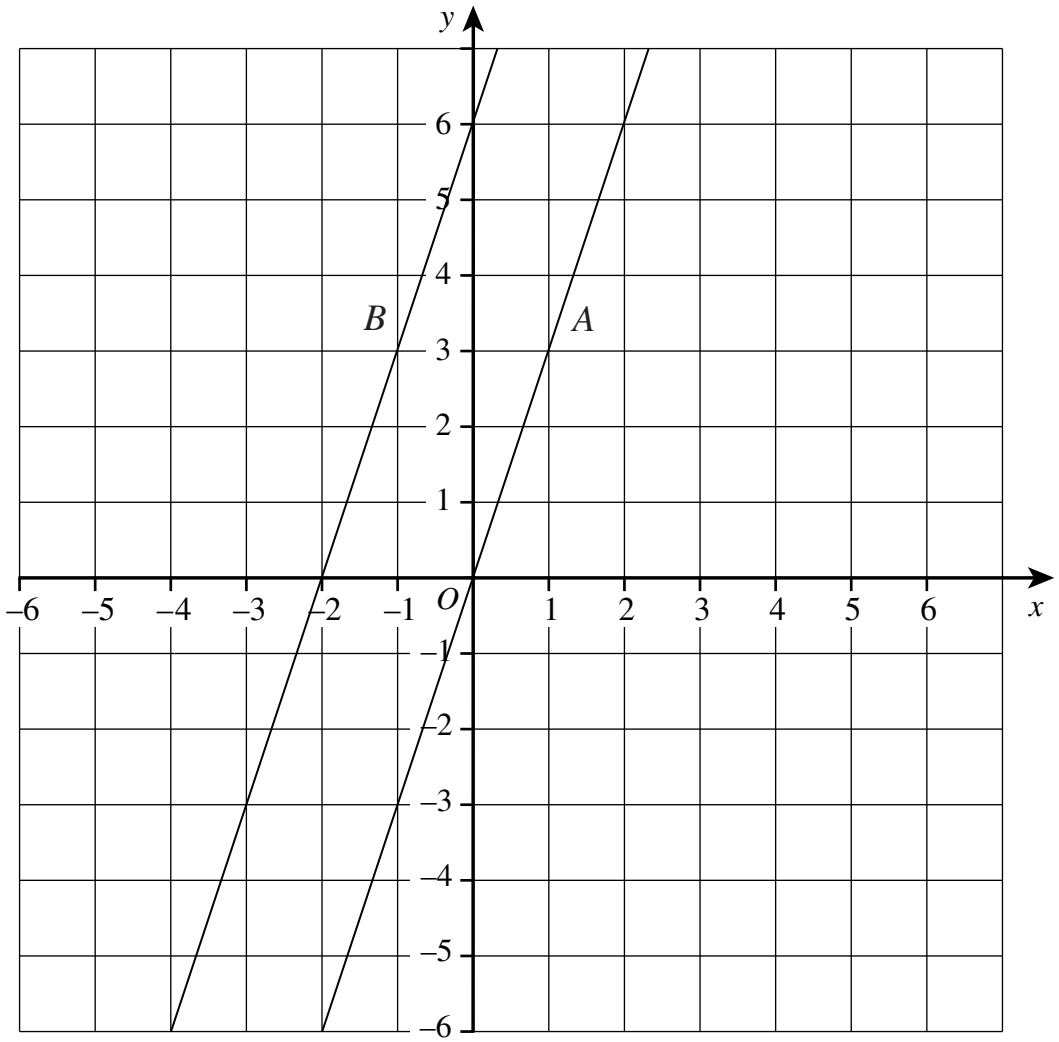
.....

.....

Answer ..... *(3 marks)*

13

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*.

.....

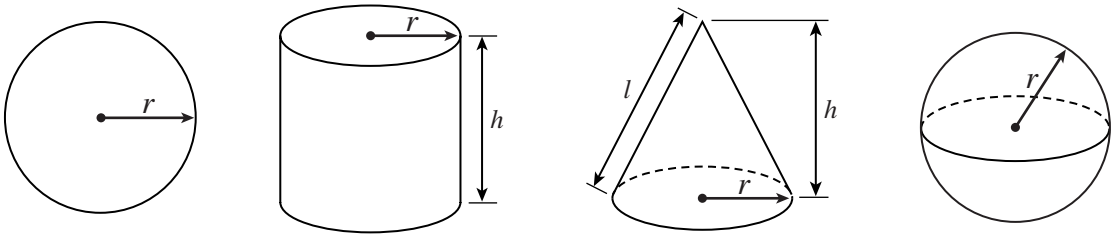
Answer ..... *(1 mark)*

(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

8

There are no questions printed on this page