

- 1 Using your calculator, find the value of
- (a)  $\frac{4 + \sqrt{2}}{3}$ , leaving your answers in 2 decimal places,
- (b)  $1\frac{3}{5} + 2\frac{11}{20} - \frac{19}{15}$ , leaving your answers in fraction.

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

(b) ..... [1]

- 2 Complete the following number sequences:

(a) 3, 4, 8, 17, 33, \_\_\_\_\_, \_\_\_\_\_

(b)  $\frac{7}{8}, \frac{3}{8}, \frac{1}{8}, 0, -\frac{1}{16}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$

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

(b) ..... [1]

- 3 (a) Express  $\frac{17}{40}$  as a percentage.
- (b) Find the decimal number that is exactly between -1.1 and 0.7.



Answer (a) ..... [2]  
(b) ..... [1]  
(c) ..... [1]

- 5 On a particular map, 2 cm represents 3 km on the actual ground.
- (a) Express the scale of the map in the form 1:n.
  - (b) If 2 points on the map are 11 cm apart, find the actual distance. Express your answer in kilometres.
  - (c) If a particular piece of land is drawn to have  $12 \text{ cm}^2$ , what is the actual area of the land? Express your answer in  $\text{km}^2$ .

- Answer (a) ..... [1]  
 (b) ..... km [1]  
 (c) ..... km<sup>2</sup> [2]

- 6 (a) Factorize  $18x^2 - 2y^2$ .  
 (b) Express  $\frac{4}{ac} + \frac{3}{ab}$  as a fraction with a single denominator.

Answer (a) .. [2]

.....

(b) .. [1]

.....



- 8 Solve the simultaneous equations  
 $5x - 8y = -7$  and  $2y - x = 1$ .

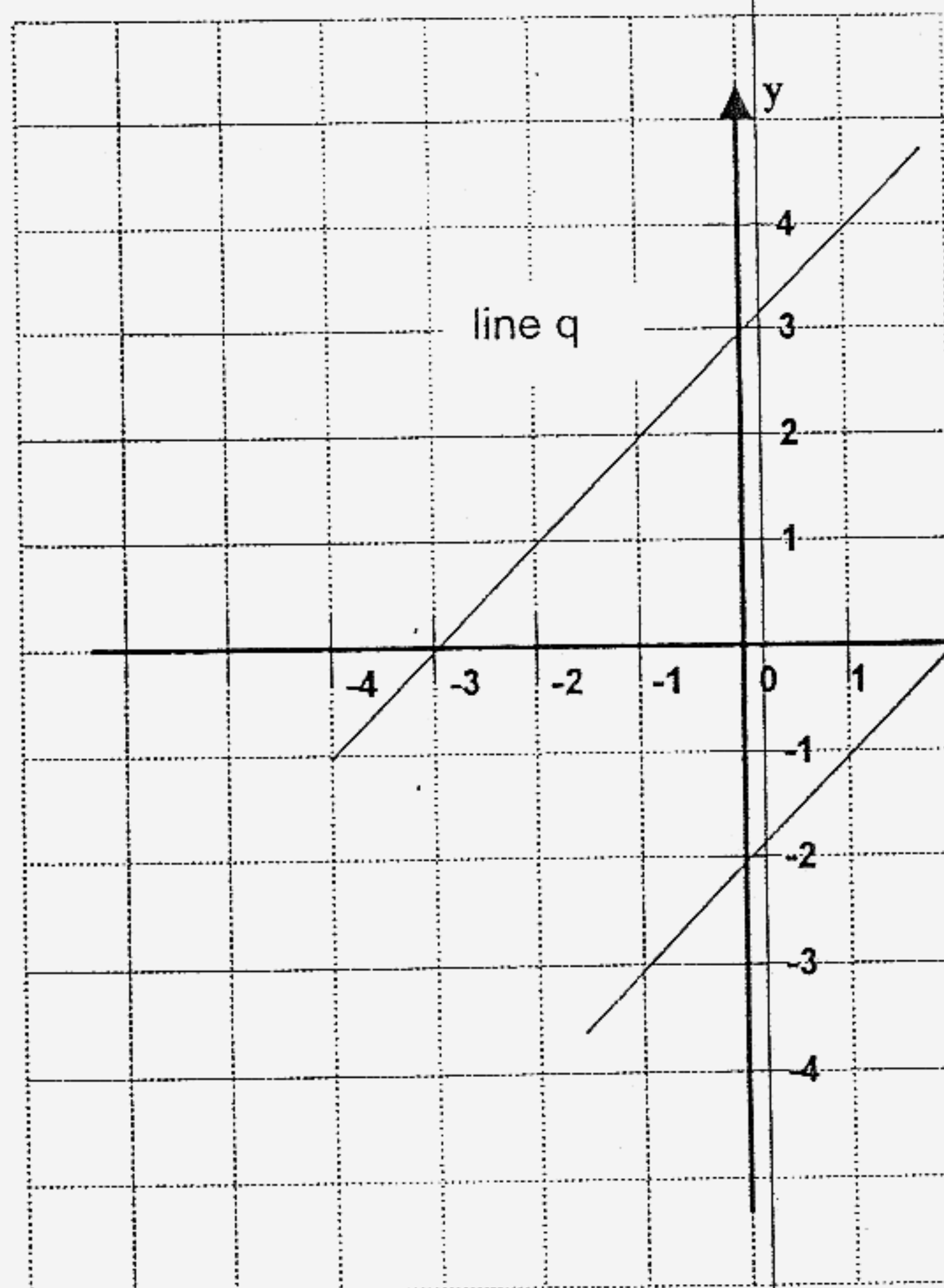
Answer  $x =$

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

$$y = \begin{bmatrix} 3 \\ \end{bmatrix}$$

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

- 9 The graph below shows two parallel lines, p and q.

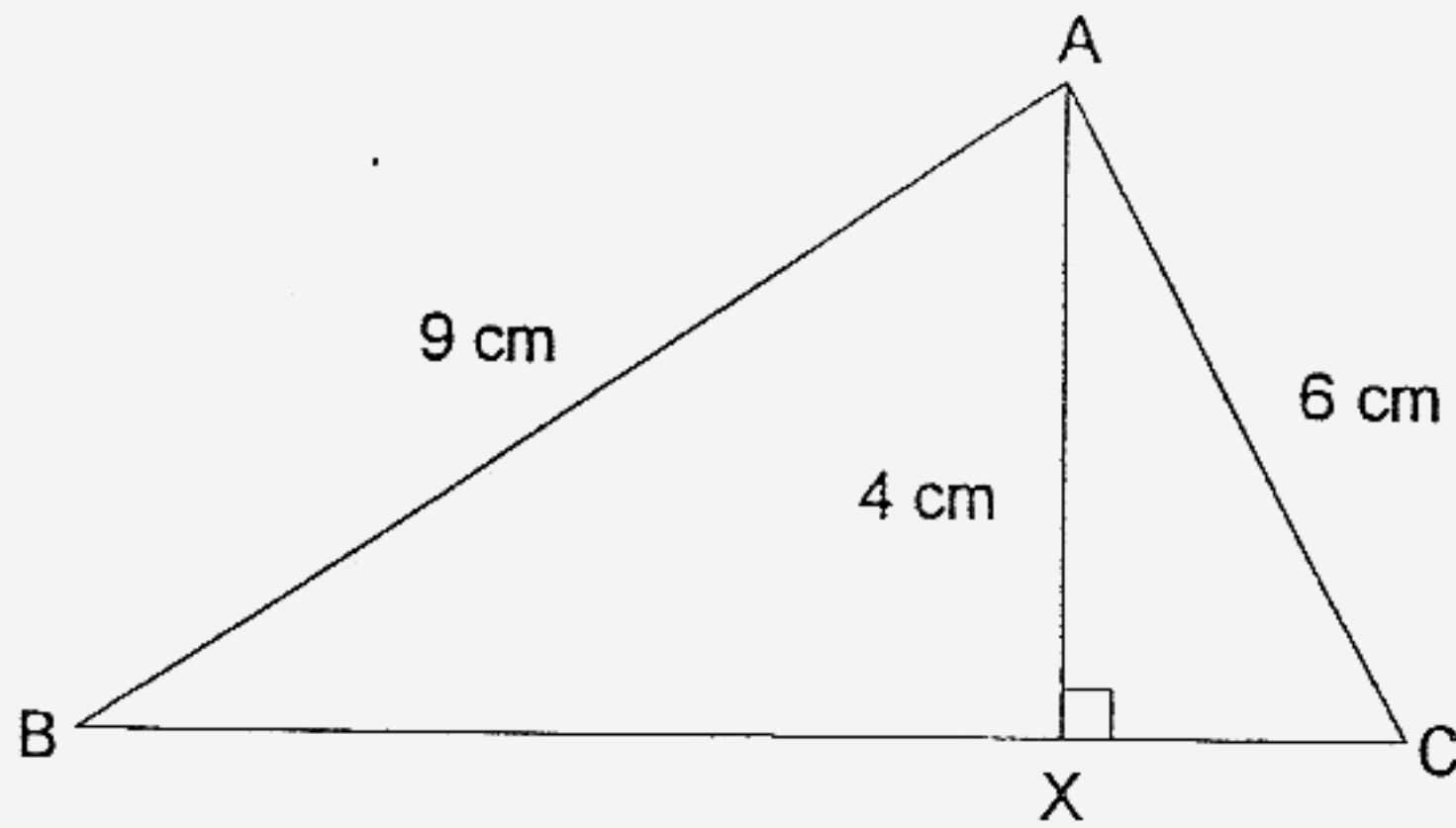


- (a) Given that the equation of line p is  $y = x - 2$ . Write down the equation of line q.
- (b) On the axes, draw and label the following graphs:
- $x = 1$ ,
  - $y = -3$ .

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

(b) Draw clearly on the diagram [2]

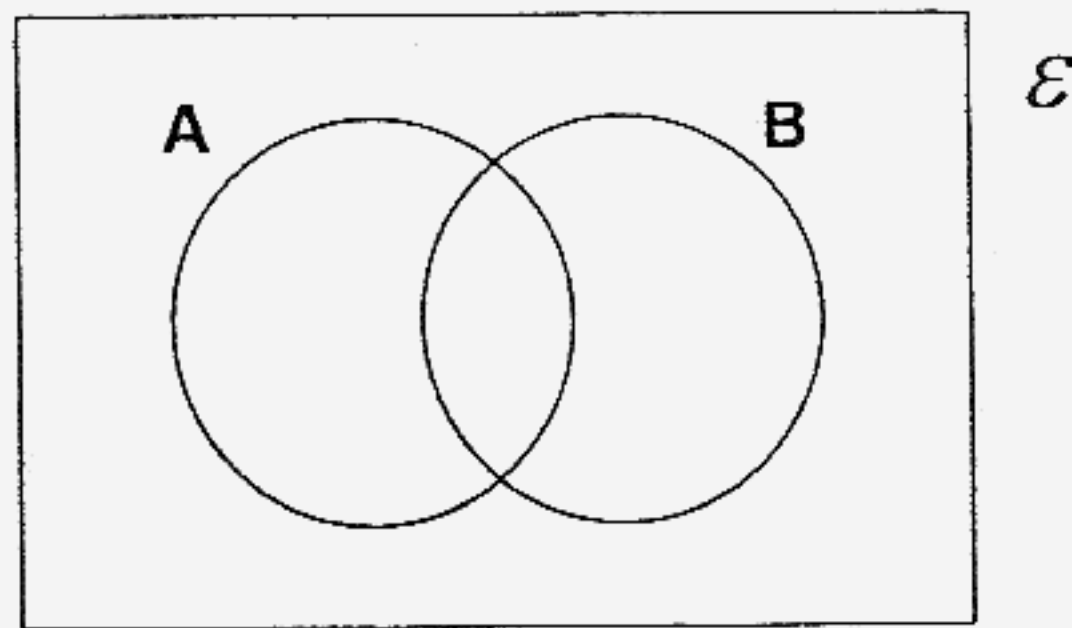
- 10 In the figure below,  $AB = 9 \text{ cm}$ ,  $AC = 6 \text{ cm}$ ,  $AX = 4 \text{ cm}$  and  $\hat{A}XC = 90^\circ$ .  
Calculate the length of  $BC$ , giving you answer correct to 3 significant figures.



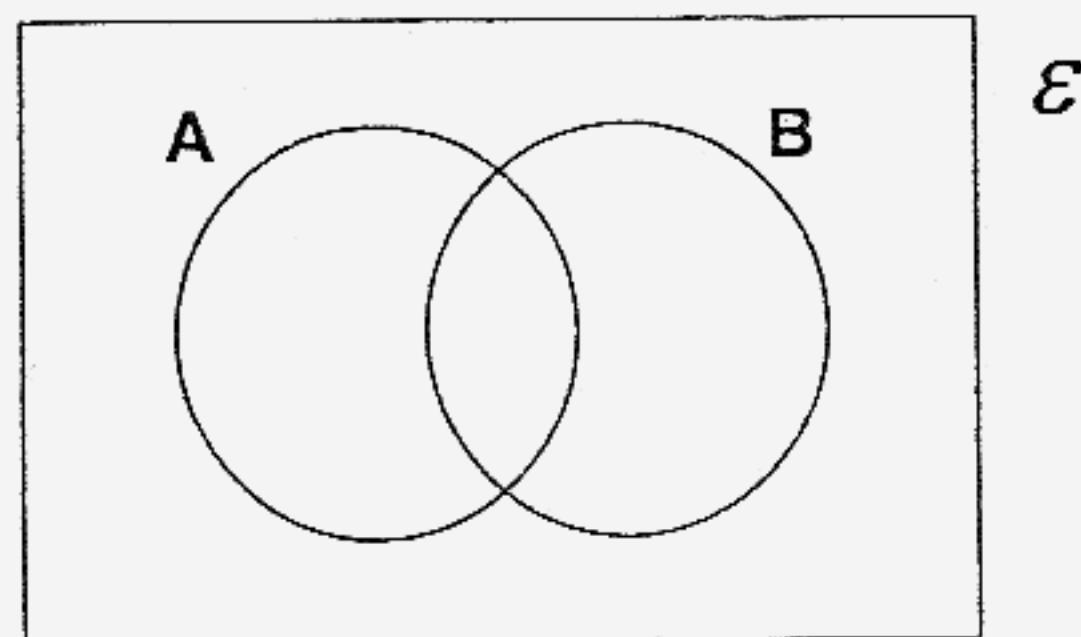


Answer ..... cm [3]

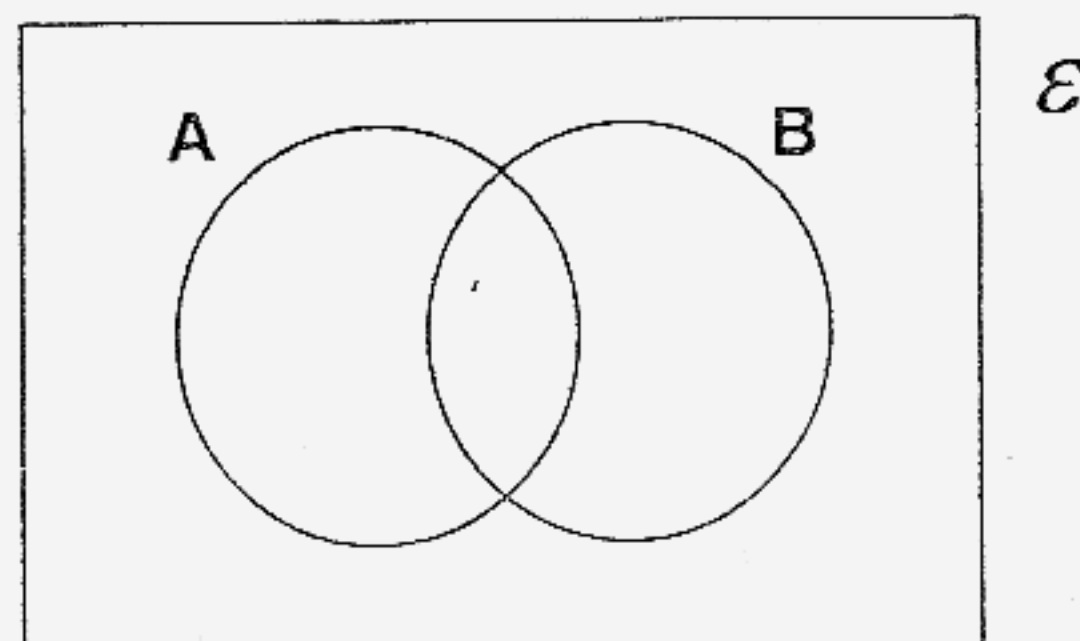
11 (a) In the Venn diagram, shade  $A'$  :



(b) In the Venn diagram, shade  $A \cap B$  :



(c) In the Venn diagram, shade  $(A \cap B)'$  :



- Answer (a) Shade clearly on the diagram. [1]  
 (b) Shade clearly on the diagram. [1]  
 (c) Shade clearly on the diagram. [2]

12 The table shows the number of cars owned by 25 families.

2	0	3	4	1
0	1	1	2	3
2	3	6	1	0
1	2	0	3	2
3	4	1	2	1

(a) Complete the table below using the given information.

No. of Cars	0	1	2	3	4	5	6
No. of Families							

- (b) Find  
 (i) the mean number of cars,  
 (ii) the median number of cars,  
 (iii) the modal number of cars.

Answer (a) Write your answers clearly into the table. [2]

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

(ii) ..... [1]

(iii) ..... [1]

13 A bag contains 5 green balls, 3 red balls, 2 white balls and 1 blue ball.

A ball is chosen at random. Find the probability that

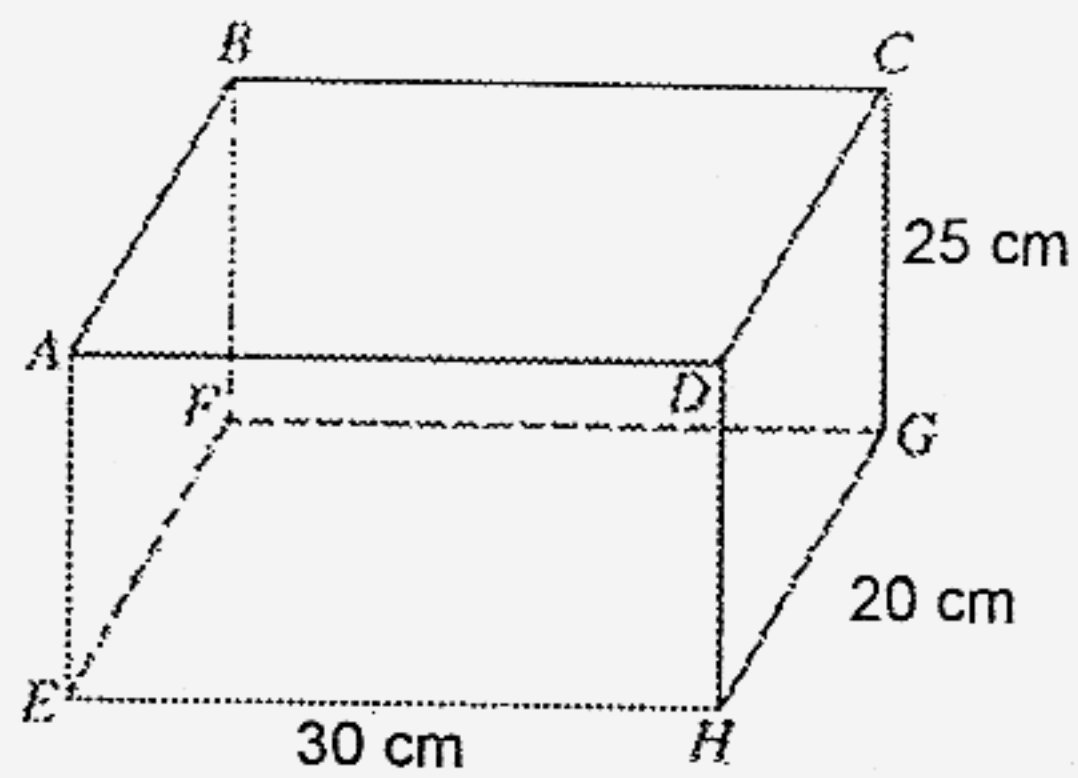
- (a) the ball is red,
- (b) the ball is not white,
- (c) the ball is green or blue.

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

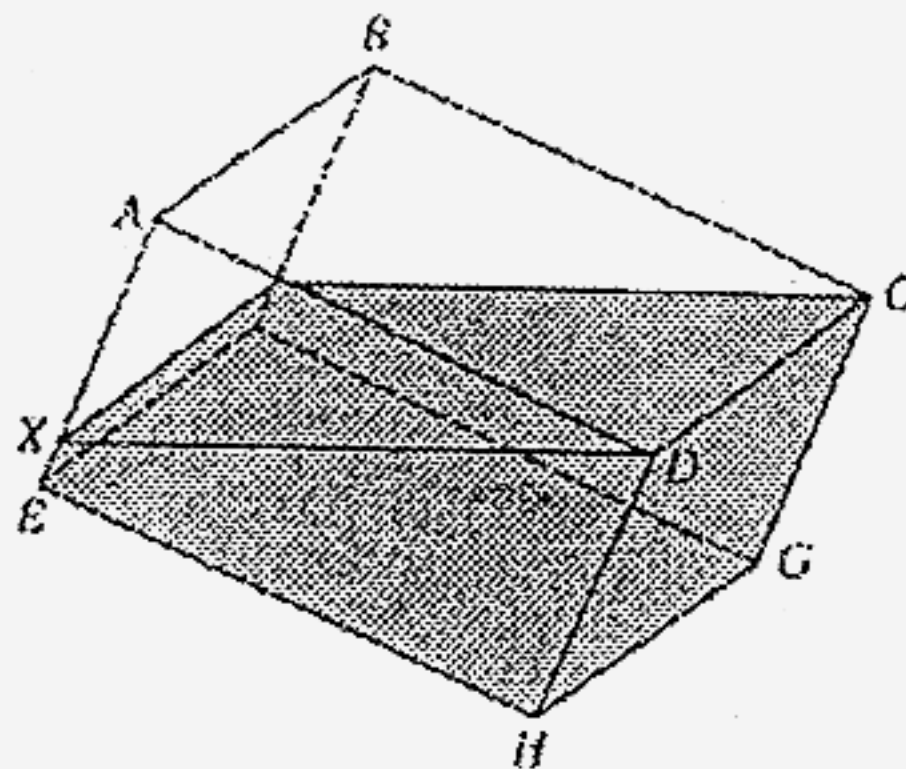
(b) ..... [1]

(c) ..... [1]

- 14 An open rectangular glass tank has dimensions as shown in the figure below.  $9000 \text{ cm}^3$  of water is poured into the tank.



- (a) Calculate the depth of the water.  
 (b) The tank is then tilted about side GH until the water just reaches the edge CD. Find the length of EX.

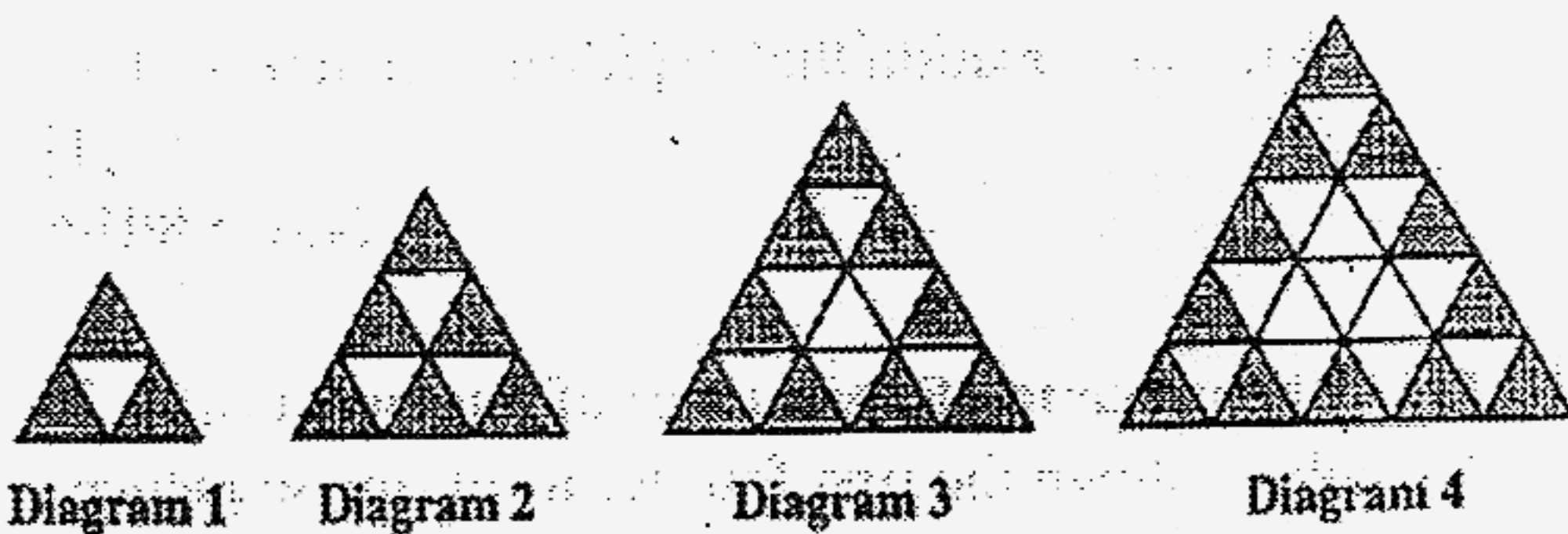


Answer (a) .....cm [1]

(b) .....cm [3]

15 A series of diagrams of shaded and unshaded small triangles is shown below.

The shaded triangles are those with at least one side on the edge of the big triangle. All of the other small triangles are unshaded.



The table below shows the number of shaded triangles and unshaded triangles in each diagram.

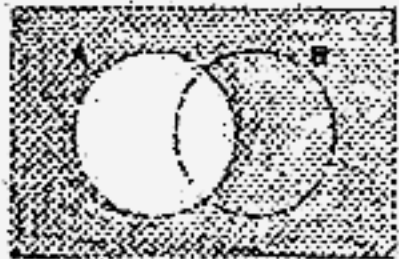
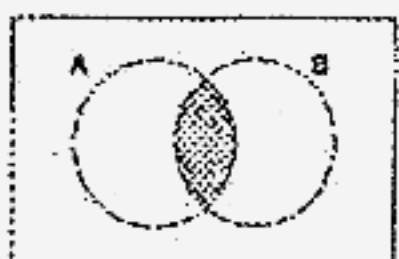
Diagram	1	2	3	4	5
No. of shaded triangles	3	6	9		
Total no. of triangles	4	9	16	25	
No. of unshaded triangles	1	3	7		

- (a) Complete the column for Diagram 4.
- (b) Complete the column for Diagram 5.
- (c) Express in the term of  $n$ , the no. of unshaded triangle which Diagram  $n$  has.

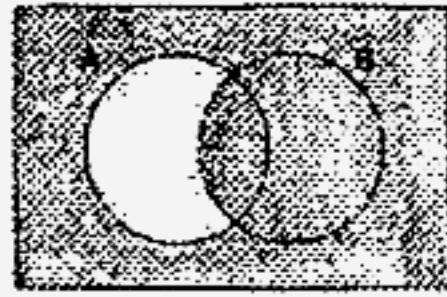
- Answer (a) Write your answers clearly in the table. [1]
- (b) Write your answers clearly in the table. [1]
- (c) ..... [2]

\*\*\* End of Paper \*\*\*

Answers

- 1 (a) 1.80  
(b)  $2\frac{53}{60}$
- 2 (a) 58,94  
(b)  $\frac{3}{32}, \frac{7}{64}$
- 3 (a) 42.5%  
(b) -0.2
- 4 (a)  $y=6x-9$   
(b) 33  
(c) 12
- 5 (a) 1:150000  
(b) 16.5 km  
(c)  $27 \text{ km}^2$
- 6 (a)  $2(3x-y)(3x+y)$   
(b)  $\frac{4b+3c}{abc}$
- 7 (a)  $p = \frac{r-q-2n}{2}$   
(b)  $\frac{y^2}{3xz}$
- 8  $x=-3, y=-1$
- 9 (a)  $y=x+3$
- 10 12.5
- 11 (a)   
(b) 

(c)



- 12 (a) 4,7,6,5,2,0,1  
 (b) (i) 1.92  
 (ii) 2  
 (iii) 1
- 13 (a) 3/11  
 (b) 9/11  
 (c) 6/11
- 14 (a) 15 cm  
 (b) 5 cm
- 15 (a) 12,13  
 (b) 15,36,21  
 (c)  $n^2 - n + 1$

Answer all questions. Show all your workings clearly.

1 Solve the following equations:

(a)  $\frac{3x-2}{3} - \frac{x+3}{4} = 1$  [2]

(b)  $(x-5)^2 = 9$  [3]

2 In May 2006, Mr. Tan bought  $x$  toys for \$27.

(a) Write down, in term of  $x$ , an expression for the amount he paid for each toy. [1]

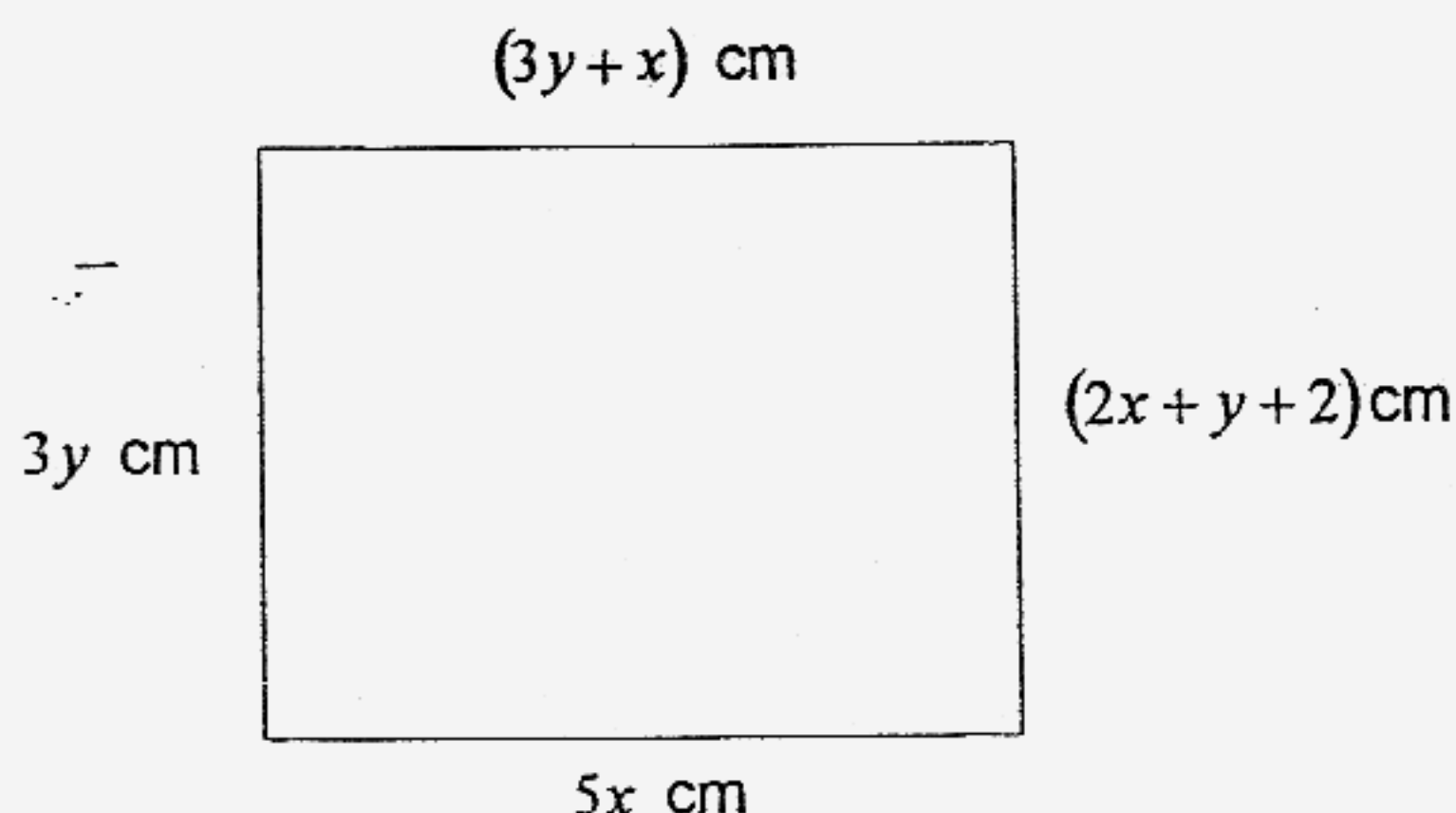
(b) He sets a selling price to make a profit of 50 cents for every toy sold. Write down, in term of  $x$ , an expression for this selling price. [1]

(c) He found that he was only able to sell 8 toys at the selling price. He reduced the selling price to \$2, and was able to sell all the remaining toys. Write down, in term of  $x$ , an expression for the amount of money he received from selling the remaining toys. [1]

(d) Given that Mr. Tan received \$30 altogether from the sale of all the toys, form an equation in  $x$  and show that it reduces to  $x^2 - 21x + 108 = 0$ . [2]

(e) Solve the equation to find the possible values of  $x$ . [2]

3 The diagram shows a rectangle.



(a) By forming a pair of simultaneous equations and solving them, find the values of  $x$  and  $y$ . [3]

(b) Using the values of  $x$  and  $y$  obtained in (a), calculate the area of the rectangle. [1]



4 Answer the whole of this question on a sheet of graph paper.

- (a) Using 2 cm to represent 1 unit on both axes, draw the graph of  $4x + 2y = 3$  [2]  
for  $-2 \leq x \leq 2$ .
- (b) On the same axes, draw another graph to solve the simultaneous [3]  
equations  $4x + 2y = 3$  and  $x + y = 2$  graphically.

5 Answer the whole of this question on a sheet of graph paper.

Copy and complete the following table for  $y = x^2 + x - 2$ .

$x$	-3	-2	-1	0	1	2	3
$y$	4			-2		4	

- (a) Using 2 cm to represent 1 unit on the  $x$ -axis and 1 cm to represent 1 [2]  
unit on the  $y$ -axis, draw the graph of  $y = x^2 + x - 2$  for  $-3 < x < 3$ . [3]
- (b) Use your graph to
- (i) find the values of  $x$  when  $y = 3$ , [2]
- (ii) find the value of  $y$  when  $x = -1.3$ , [1]
- (iii) solve the equation  $x^2 + x - 2 = 0$ , [1]
- (iv) the minimum value of  $y$ . [1]

- 6 (a) The table below shows the age in months of the books that a student has collected.

Age in months ( $m$ )	Number of books ( $f$ )
$0 < m \leq 10$	10
$10 < m \leq 20$	15
$20 < m \leq 30$	25
$30 < m \leq 40$	20
$40 < m \leq 50$	30
$50 < m \leq 60$	15

- (i) State the modal class. [1]
- (ii) Calculate an estimate mean age of the books. [3]
- (iii) If the student randomly picks a book from his collection, what is the [1]  
probability that the age of the book is older than 30 months?
- (b) The distribution of marks scored by pupils of a class is as follows:

Marks	4	5	6	7	8	9	10
No. of Pupils	7	5	6	3	$x$	8	7

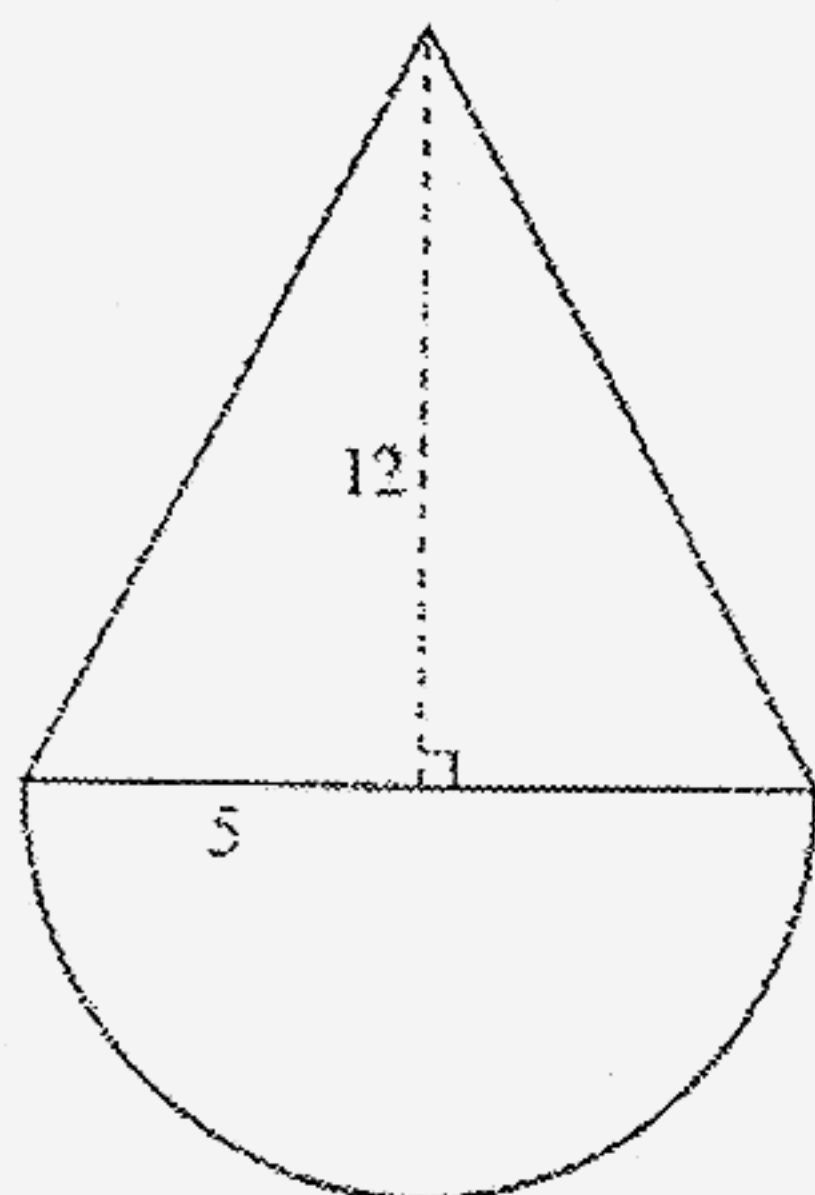
If the median mark is 7, write down all the possible values of  $x$ . [2]

- 7 Given that  $\varepsilon = a, b, c, d, e, f, g$ ,  $A = a, b, e, f$  and  $B = a, e$ ,
- (a) write down, in set notation, the relationship between set A and B, [1]
- (b) list the element of  $B' \cap A$ , [1]
- (c) draw a Venn diagram to represent the sets. [2]

8 [The volume of a sphere =  $\frac{4}{3}\pi r^3$ .]

[The volume of a cone =  $\frac{1}{3}\pi r^2 h$ .]

[Take  $\pi = 3.142$ ]



A solid cone has a base radius of 5 cm and height 12 cm.

A solid hemisphere has radius 5 cm.

A metal toy is formed by joining the flat faces of the cone and the hemisphere.

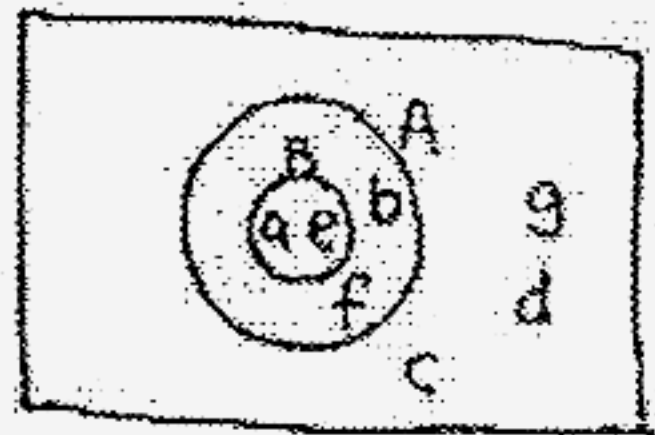
- (a) Show that the length of the slant edge of the cone is 13 cm. [2]
- (b) Calculate the volume of the toy. [3]
- (c) A solid metal cylinder has a radius of 1.5 m and height 2 m. The cylinder is melted down and all the metal was used to make a large number of these toys.

Calculate the number of toys that were made. [3]

\*\*\* End of Paper \*\*\*

Answers

- 1 (a)  $3\frac{2}{9}$   
 (b) 2,8
- 2 (a)  $\$ \frac{27}{x}$   
 (b)  $\$ \left( \frac{27}{x} + 0.5 \right)$   
 (c)  $\$ 2(x-8)$   
 (e) 9 or 12
- 3 (a)  $x=3, y=4$   
 (b)  $180 \text{ cm}^2$
- 4 (b)  $x=-0.5, y=2.5$
- 5 (b) (i) 1.8, -2.8  
 (ii) -1.5  
 (iii) -2, 1  
 (iv) -2.2
- 6 (a) (i)  $40 < x \leq 50$   
 (ii) 29.5 months  
 (iii)  $\frac{1}{2}$
- 7 (b) 1,2,3,4,5  
 (a)  $B \subset A$   
 (b)  $B' \cap A = b, f$   
 (c)



- 8 (b)  $576 \text{ cm}^3$   
 (c) 24546 toys