ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

1 **(a)** Write 0.1962 correct to ;

(i) 2 decimal places. *Answer* : ..... [1]

(ii) 3 significant figures. *Answer* : ..... [1]

(b) Arrange in ascending order $\frac{13}{20}, 0.7, \frac{7}{12}, 0.64, \frac{5}{8}$

Answer ..... , ... , ... , ... , ... [2]

2 Write down for the followings.

Figure	**Lines of symmetry**	**Order of Rotational symmetry**	
Parallelogram	.....	.....	[1]
Square	.....	.....	[1]
Isosceles Triangle	.....	.....	[1]

3 It is given that $p = \dfrac{12}{\sqrt[3]{q}}$.

(a) Find the value of p when $q = 64$.

Answer : ..... [1]

(b) Describe the relationship between p and q in words by completing the sentence :

p is ..... proportional to the cube root of q. [1]

4 **(a)** Evaluate 3^{-2}

Answer : ..... [1]

(b) Find the value of x in the equation $3^x \div 3^2 = 1$

Answer : x= ..... [2]

5 Given that $\mathbf{A} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$

(a) Calculate the value of the determinant **A**.

Answer : ..... [1]

(b) Given that **AB = I**, where **B** is a 2×2 matrix.

Find **B**.

Answer : $\mathbf{B} = \begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(c) Calculate $\begin{pmatrix} 1 & -2 & 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ -5 \\ 7 \end{pmatrix}$

Answer : $\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

6 If $x = 6.4 \times 10^{-2}$ and $y = 8 \times 10^{6}$.

Calculate, giving your answer in **standard form**,

(a) $\frac{x}{y}$

Answer : ..... [1]

(b) $2xy$

Answer : ..... [2]

7 **(a)** The ratio of Sayed's age to his mother's age is 2 : 7. Sayed is 14 years old. How old is his mother?

Answer :.....years [1]

(b) The ratio of Fatima's age to her father's age is 3 : 8. The total of their ages is 66 years. How old is Fatima?

Answer :.....years [1]

8 An empty lorry has a mass of 4.3 tonnes, correct to the nearest tenth of a tonne.

(a) What is the lower bound for the mass of the empty lorry?

Answer .....tonnes [1]

(b) The total mass of the lorry and its load is 6.8 tonnes, correct to the nearest tenth of a tonne. Find the upper bound for the mass of the load.

Answer .....tonnes [1]

9 **(a)** The actual area of a town is 62.5 km^2. What would be its area, in cm^2, on a map drawn to a scale of 1 : 250000 ?

Answer : ..... cm^2 [2]

(b) Matthew invested \$500 at 6% simple interest per year.
Calculate how much interest had been earned after 8 months.

Answer : \$ ..... [1]

10 **(a)** Write as a single fraction $\frac{2x+3}{2} - \frac{x-4}{3}$

Answer : ..... [2]

(b) **(i)** Factorise $a^2 \quad b^2$.

Answer : ..... [1]

(ii) Using the answer of part **(b) (i)**, evaluate the value of

$$2030^2 \quad 2029^2 + 2028^2 \quad 2027^2$$

Answer : ..... [1]

(c) Rearrange the formula to make c the subject. $b = m\,(a - c)$

Answer : c = ... [1]

11 When it is 07 00 in London, the time in Singapore is 16 00.

(a) What is the time in Singapore when it is 16 00 in London ?

Answer : ..... [1]

(b) A plane left Singapore and reached London at 04 27. The journey time was 13 hours and 19 minutes. At what time the plane took off from Singapore ?

Answer : ..... [2]

12 **(a)** Write down the prime factors of 108.

Answer : ..... [1]

(b) The prime factors of 90 are $2 \times 3^2 \times 5$.

Find the H.C.F. of 108 and 90.

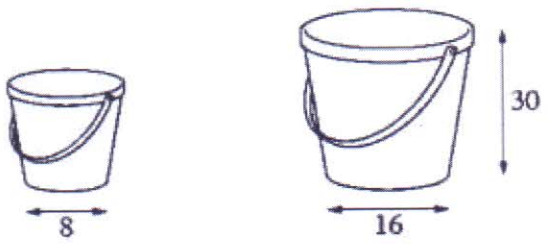
Answer : ..... [1]

(c) Given that $90n$ is a multiple of 108. Find the smallest integer value of n.

Answer : $n =$..... [1]

13 **(a)** Similar buckets are available in two sizes.

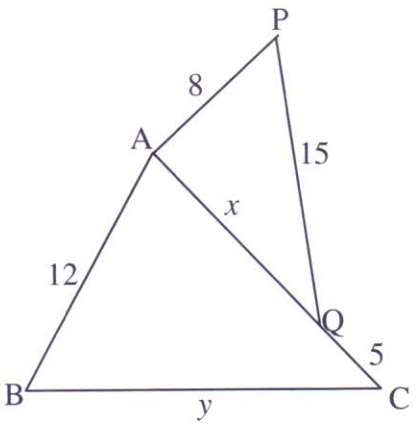
The large bucket has height 30 cm and base diameter 16 cm.
The small bucket has base diameter 8 cm.



Given that the small bucket has volume 850 cm^3, find the volume of the large bucket.

Answer :..... cm^3 [1]

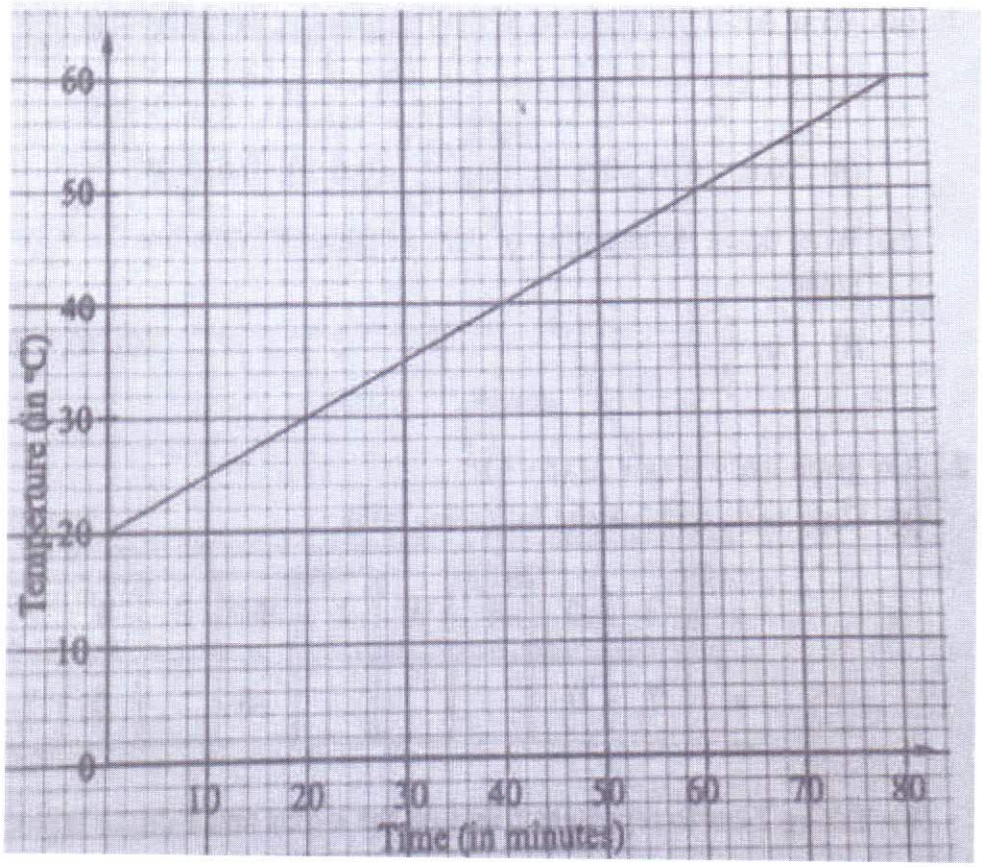
(b) Given that ABC is similar to APQ, calculate the value of x and of y.



Answer : x= ..... [1]

y = ... [1]

14 The graph shows the temperature of the water in a hot water tank after the heater is switched on.



From your graph, find

(a) the temperature of the water in the tank after

(i) 16 minutes *Answer* : .....°C [1]

(ii) 54 minutes *Answer* : .....°C [1]

(b) the time taken for the temperature to reach

(i) 34° C *Answer* : ..... minutes [1]

(ii) 54° C *Answer* : ..... minutes [1]

15 ABC is a right-angled triangle and BCD Is a straight line. Find

(a) the length of AC.

Answer : .AC=..... units [2]

(b) Using the value of AC found in part **(a)**, find the values of

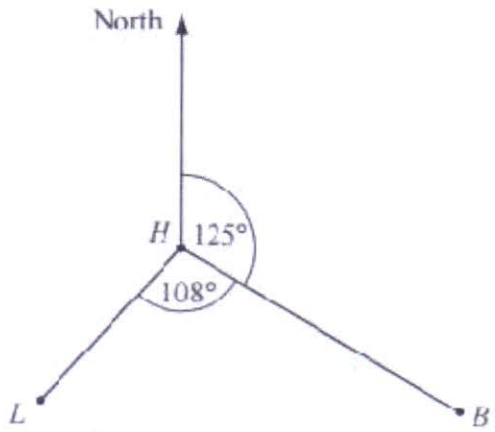
(i) sin

Answer : ..... [1]

(ii) cos

Answer : ..... [1]

16 The diagram shows the positions of a harbour, H, and a lighthouse, L. A boat is anchored at B where $L\hat{H}B = 108°$.



(a) Given that the bearing of B from H is 125°,

find the bearing of

(i) L from H,

Answer : ..... [1]

(ii) H from B.

Answer : ..... [1]

(b) At 7 30 a.m. the boat set sail in a straight line from B to H at an average speed of 25km/h. Given that BH = 70 km, find the time at which the boat reaches the harbour.

Answer :.....[2]

17

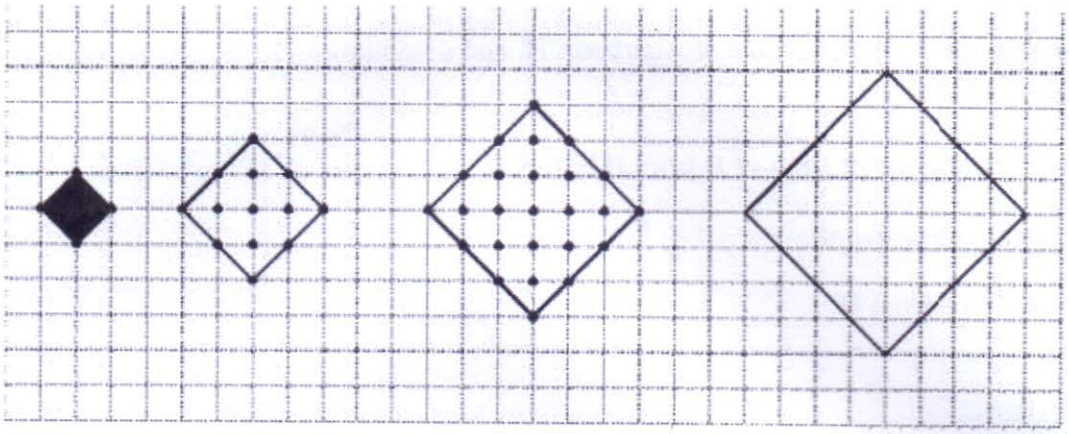


Diagram 1 Diagram 2 Diagram 3 Diagram 4

The diagrams show squares and dots on a grid.
Some dots are on the sides of each square and other dots are inside each square.

The area of the square (shaded) in Diagram 1 is 1 unit^2

(a) Complete the columns in the table below for Diagrams 4 and n.

Diagram	1	2	3	4	----------	n
Number of units of area	1	4	9		----------	
Number of dots inside the square	1	5	13		----------	$(n \quad 1)^2 + n^2$
Number of dots on the sides of the square	4	8	12		----------	
Total number of dots	5	13	25		----------	

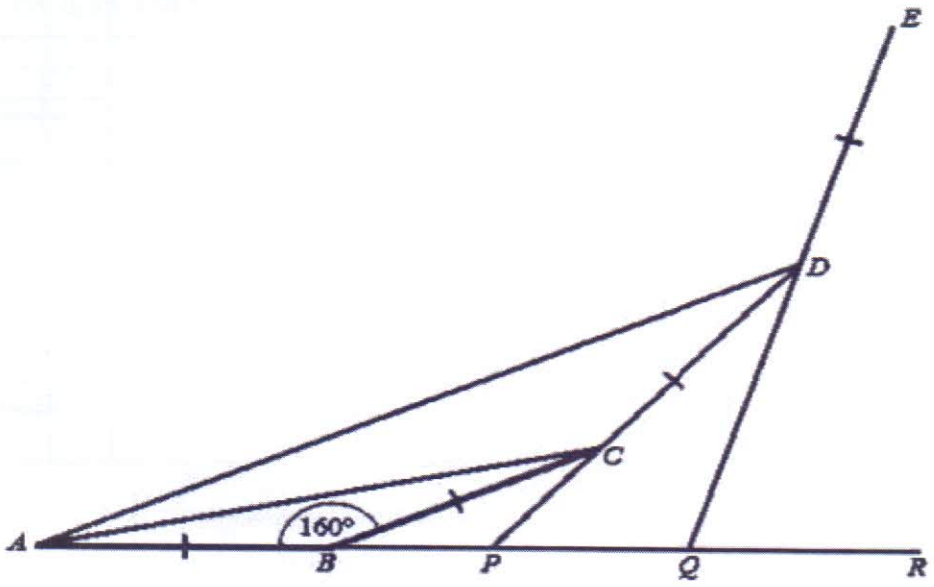
[1] [3]

(b) Which diagram has 265 dots inside the square?

Answer : .....[2]

18 In the diagram, AB, BC, CD and DE are four sides of a regular polygon.
Each interior angle of the polygon is 160°.
ABPQR, DCP and EDQ are straight lines.

(a) Find $C\hat{A}B$.



Answer : $C\hat{A}B$ =.....° [1]

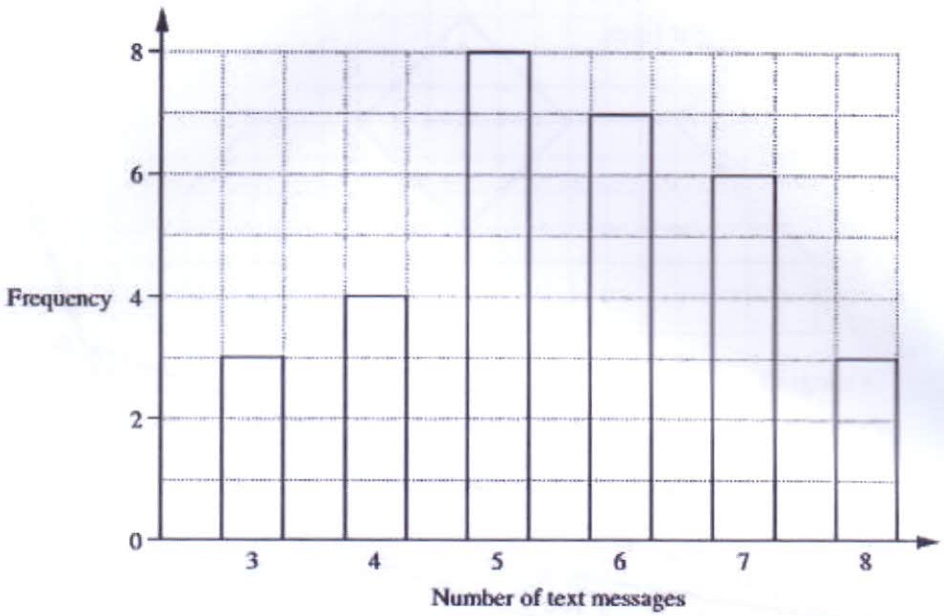
(b) Find $C\hat{B}P$

Answer : $C\hat{B}P$ =.....° [1]

(c) Find $D\hat{Q}R$

Answer : $D\hat{Q}R$ =.....° [1]

19 Urooj recorded the number of text messages sent by the students in his class on one day. The results are shown in the bar chart.



Use the bar chart to find

(a) the number of students in Urooj's class,

Answer : .....[1]

(b) the median number of text messages sent,

Answer :..... [1]

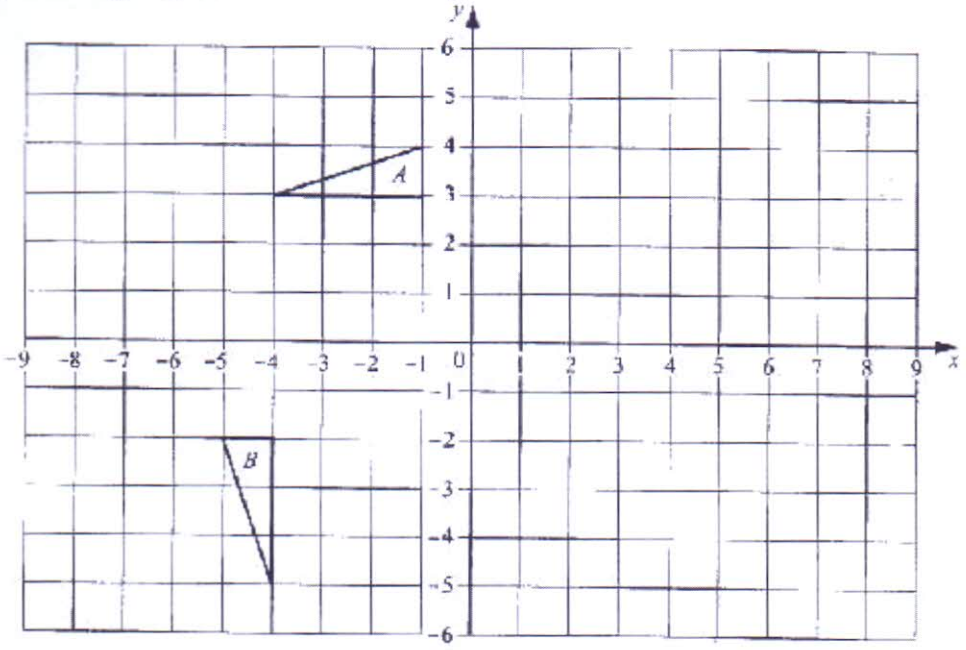
(c) the modal number of text messages sent.

Answer :..... [1]

20 The diagram in the answer space shows the triangles A and B.

(a) Triangle A is mapped onto triangle C by a translation $\begin{pmatrix} 5 \\ -6 \end{pmatrix}$.

On the diagram, draw and label triangle C.



[1]

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

.....

..... [2]

(c) Describe the transformations represented by the following matrices ;

(i) $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

.....

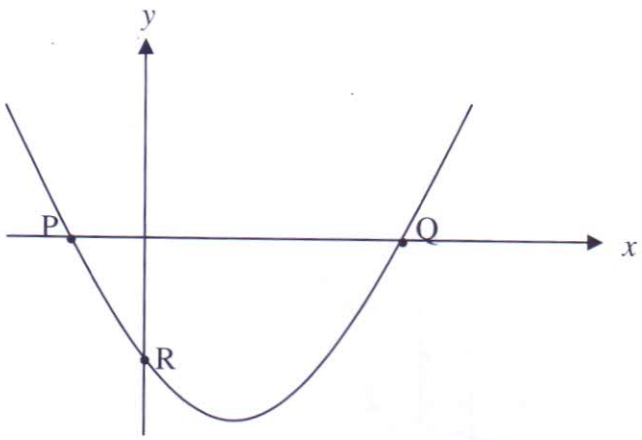
..... [1]

(ii) $\begin{pmatrix} -3 & 0 \\ 0 & 1 \end{pmatrix}$

.....

..... [1]

21



The diagram above is the graph of the equation $y = x^2 \quad 4x \quad 12$.

(a) Solve the above equation to find

(i) the coordinates of P and of Q.

Answer : P(....., ...) Q(....., ...) [2]

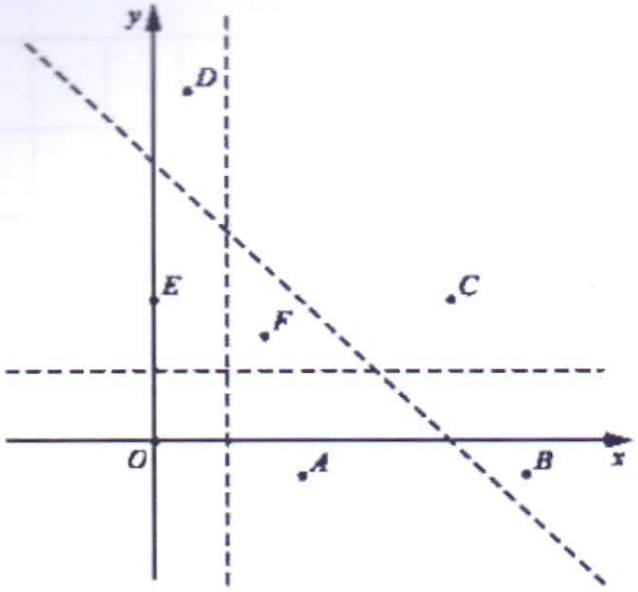
(ii) the coordinates of R.

Answer : R (....., ...) [1]

(b) Hence, find the equation of the line of symmetry of the curve.

Answer : ..... [1]

22



The diagram shows the three lines $x = 1$, $y = 1$ and $x + y = 4$ and the seven points O, A, B, C, D, E and F.

(a) Which of these seven points lie in the region defined by $x + y > 4$?

Answer ; ..... [1]

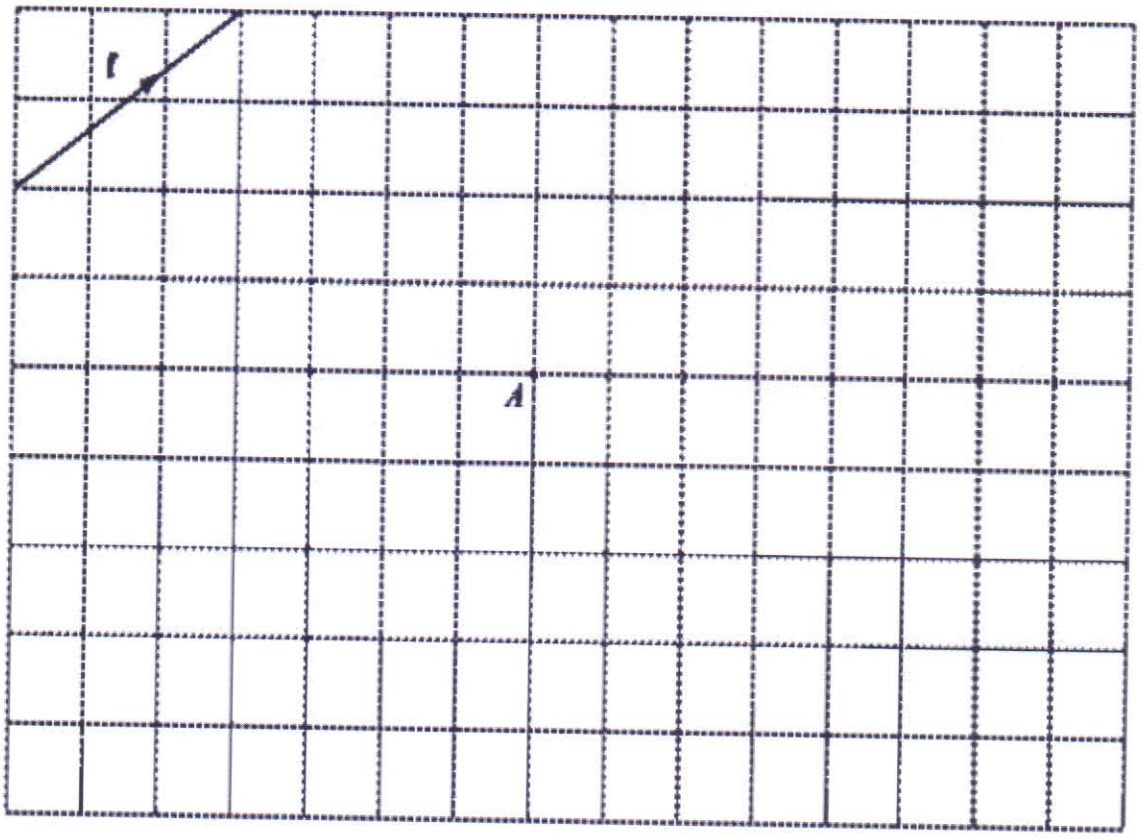
(b) Which one of these seven points lies in the region defined by $x < 1$, $y > 1$ and $x + y < 4$?

Answer ;..... [1]

(c) Given that O is (0, 0) and C is (4, 2), find the inequality that defines the region below the line that passes through O and C.

Answer ;..... [2]

23



$$\mathbf{f} = \begin{pmatrix} 3 \\ 2 \end{pmatrix} \qquad \mathbf{g} = \begin{pmatrix} 4 \\ 1 \end{pmatrix} \qquad \mathbf{h} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$$

The vector **f** and the point A are shown on the grid.
On the grid, mark and label

(a) the point B when $\overrightarrow{AB} = \mathbf{f} + \mathbf{g}$, [1]

(b) the point C when $\overrightarrow{AC} = -2\mathbf{h}$, [1]

(c) the point D when $\overrightarrow{AD} = 2\mathbf{f} - 3\mathbf{g}$. [1]