

# C.E.M. TUITION

Student Name : \_\_\_\_\_

**Review Topic : Linear Functions**

**(Preliminary Course - Paper 1)**

**Year 11 - 2 Unit**

**Question 1**

Without using square paper, plot on the Cartesian plane the three points  $A, B, C$ , whose coordinates are  $(-5, 3)$ ,  $(1, -5)$ ,  $(2, 2)$ , respectively.

- (a) Calculate the length  $AB$ .      (b) Find the equation of the line  $AB$ .
- (c) The line through  $C$ , perpendicular to  $AB$ , meets  $AB$  at  $N$ . Find the coordinates of  $N$ .
- (d) Hence, or otherwise, find the area of  $\triangle ABC$ .

(a) 10 units (b)  $4x + 3y + 11 = 0$  (c)  $(-2, -1)$  (d) 25 units<sup>2</sup>



**Question 2 :**

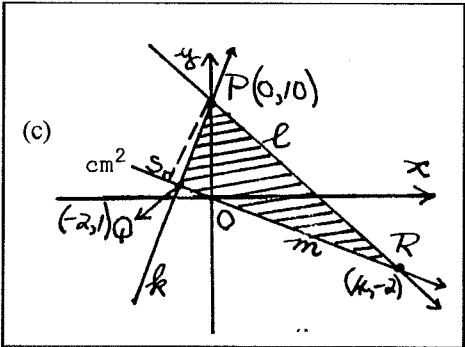
The point  $Q(-2, 1)$  lies on the line  $k$  whose equation is  $9x - 2y + 20 = 0$ .

The point  $R(4, -2)$  lies on the line  $l$  whose equation is  $3x + y - 10 = 0$ .

- (a) Show that  $k$  and  $l$  intersect at a point  $P$  on the  $y$ -axis.
- (b) Find the equation of the line  $m$  which joins  $Q$  and  $R$ .
- (c) Show, by shading on a sketch (not on graph paper), the region defined by the three inequalities  
 $9x - 2y + 20 \geq 0$ ,  $3x + y - 10 \leq 0$ ,  $x + 2y \geq 0$ .
- (d) Find, as a surd, the perpendicular distance from  $P$  to  $m$ .
- (e) Hence, or otherwise, find the exact value of the area of the triangle bounded by the three lines  $k$ ,  $l$  and  $m$ .



(a) intersect at (0, 10) (b)  $x + 2y = 0$  (c)  $4\sqrt{5}$  (e)  $30 \text{ units}^2$



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**Question 3 :**

- (a)  $A(1, 8)$ ,  $B(3, 7)$  and  $C(-2, 5)$  are three vertices of a parallelogram  $ABCD$ .  
Find the coordinates of  $D$ .
- (b) Show that the points  $A(3, -1)$ ,  $B(7, 2)$  and  $C(1, 10)$  are the vertices of a right-angled triangle.  
Also find the area of  $\triangle ABC$ .

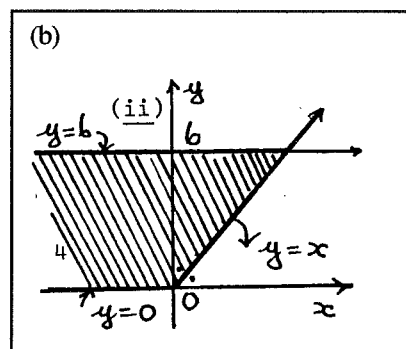
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(a) $(-4, 6)$ (b) $25 \text{ units}^2$
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**Question 4 :**

- (a) Find the equation of the line passing through the point (2, 7) and parallel to the line  $2x - 3y = 8$ .
- (b) On a sketch indicate, by suitable shading and labelling, the region  $\{(x, y) : y \geq x\} \cap \{(x, y) : 0 \leq y \leq 6\}$ .

(a)  $2x - 3y + 17 = 0$



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**Question 5 :**

- (a) The three lines  $3x - y = 6$ ,  $2x + y = 14$  and  $y = 0$  enclose a triangle. Find its area.
- (b) The two perpendicular lines  $3x + 2y = 12$ ,  $2x + ay = b$  intersect at the point  $(2, 3)$ . Find the values of  $a$  and  $b$ .
- (c) Show that the points  $(2, 7)$ ,  $(5, 13)$ ,  $(-4, -5)$  are collinear.

(a) 15 units<sup>2</sup> (b)  $a = -3, b = -5$

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**Question 6 :**

- (a) Give three inequalities satisfied by every point in the interior of the triangle with vertices  $(0, 0)$ ,  $(1, 0)$ ,  $(0, 1)$  and such that no point outside the triangle satisfies all three inequalities.
- (b)  $R$  is the foot of the perpendicular from the point  $P(-5, 10)$  to the line  $4x - 3y = 0$ . Find the coordinates of  $R$ .

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(a)  $x > 0, y > 0, x + y < 1$  (b)  $R(3, 4)$

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