Sample Paper 2: Paper 2

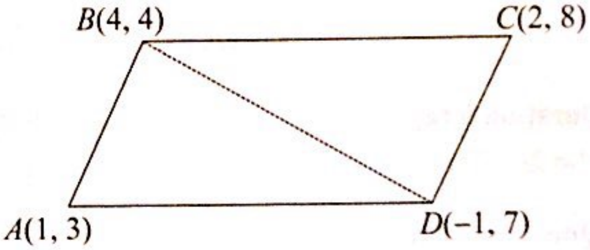
Question 1 (25 marks)

Question 1 (a)

The diagonal bisects the area of a parallelogram. Find the area of triangle ABD and multiply the answer by 2.

$A(1, 3) \to (0, 0)$
$B(4, 4) \to (3, 1)$
$D(-1, 7) \to (-2, 4)$

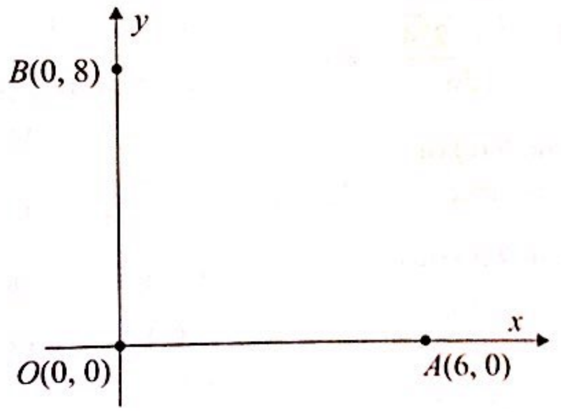
$$A = \tfrac{1}{2}|x_1y_2 - x_2y_1|$$
$$= \tfrac{1}{2}|3(4) - (-2)(1)|$$
$$= \tfrac{1}{2}|12 + 2|$$
$$= 7$$



Area of parallelogram $ABCD = 14$

Note: The diagram in the question is a rough sketch showing the relative positions of the points. A grid is drawn whenever we wish to display the absolute positions of the points.

Question 1 (b)



Intercepts of $2x + 3y = c$: $D(\tfrac{1}{2}c, 0)$, $E(0, \tfrac{1}{3}c)$

$O(0, 0)$, $D(\tfrac{1}{2}c, 0)$, $E(0, \tfrac{1}{3}c)$

Area $|\Delta ODE| = \tfrac{1}{2}|(0)(0) - (\tfrac{1}{2}c)(\tfrac{1}{3}c)| = \tfrac{1}{2}|\tfrac{1}{6}c^2|$

$O(0, 0)$, $A(6, 0)$, $B(0, 8)$

Area $|\Delta OAB| = \tfrac{1}{2}|(0)(0) - (6)(8)| = \tfrac{1}{2}|48|$

Area $|\Delta ODE| = \tfrac{1}{2}$ Area $|\Delta OAB|$

$\therefore \tfrac{1}{2}|\tfrac{1}{6}c^2| = \tfrac{1}{2} \times \tfrac{1}{2}|48|$

$\tfrac{1}{6}c^2 = 24$

$c^2 = 144$

$\therefore c = \pm\sqrt{144} = \pm 12$