Sample Paper 7: Paper 2

Question 1 (25 marks)

Question 1 (a)

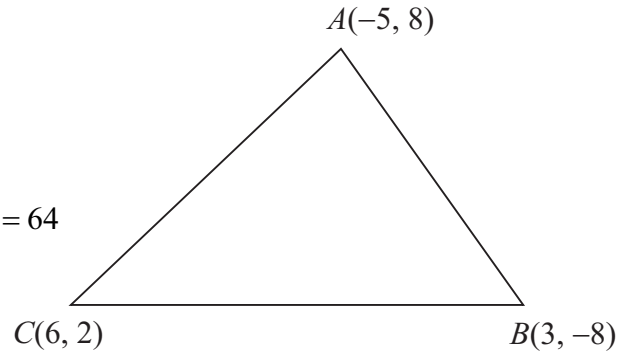
$A(-5, 8) \to (0, 0)$

$B(3, -8) \to (8, -16)$

$C(6, 2) \to (11, -6)$

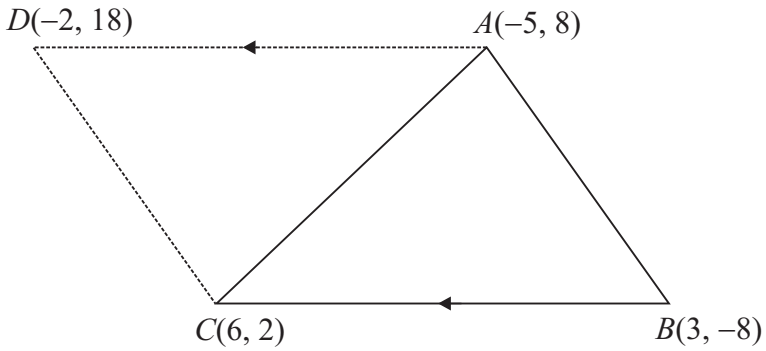
$\boxed{\text{Area} = \tfrac{1}{2}\left|x_1y_2 - x_2y_1\right|}$

$\text{Area} = \tfrac{1}{2}\left|8(-6) - 11(-16)\right| = \tfrac{1}{2}\left|-48 + 176\right| = \tfrac{1}{2}\left|128\right| = 64$



$B(3, -8) \to C(6, 2)$

$A(-5, 8) \to D(-2, 18)$



Question 1 (b)

Equation of BC: $B(3, -8)$, $C(6, 2)$

$$m = \frac{2-(-8)}{6-3} = \frac{10}{3}, \ (x_1, y_1) = (3, -8) \qquad \boxed{y - y_1 = m(x - x_1)}$$

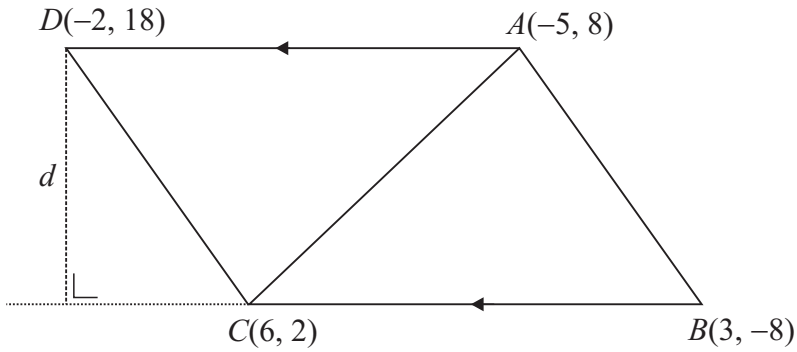
$$y - (-8) = \tfrac{10}{3}(x - 3)$$

$$3y + 24 = 10x - 30$$

$$10x - 3y - 54 = 0$$

$$\boxed{d = \frac{\left|ax_1 + by_1 + c\right|}{\sqrt{a^2 + b^2}}}$$

$$d = \frac{\left|10(-2) - 3(18) - 54\right|}{\sqrt{10^2 + (-3)^2}} = \frac{128}{\sqrt{109}}$$



$B(3, -8)$, $C(6, 2)$

$\text{Area} = \text{Base} \times \text{Height}$

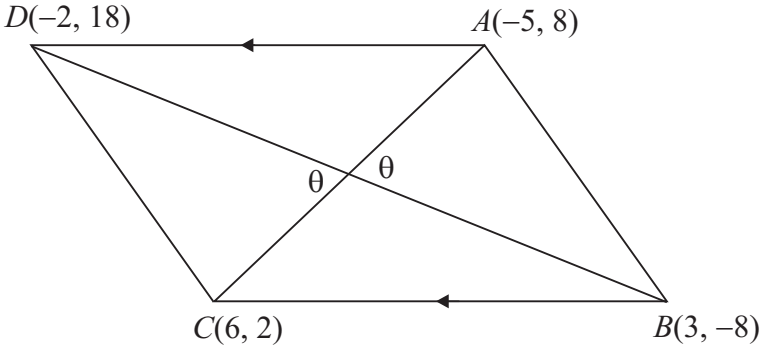
$\text{Base:} \left|CB\right| = \sqrt{(6-3)^2 + (2-(-8))^2} = \sqrt{109}$

$\text{Area} = \sqrt{109} \times \dfrac{128}{\sqrt{109}} = 128$

OR

Area of parallelogram $ABCD$ = 2(Area of triangle ABC)

Question 1 (c)



Slope of AC: $m_1 = \dfrac{8-2}{-5-6} = -\dfrac{6}{11}$

Slope of BD: $m_2 = \dfrac{18+8}{-2-3} = -\dfrac{26}{5}$

$$\tan\theta = +\left(\frac{m_1 - m_2}{1 + m_1 m_2}\right) = \frac{-\frac{6}{11} + \frac{26}{5}}{1 + (-\frac{6}{11})(\frac{26}{5})}$$

$$\therefore \theta = \tan^{-1}\left(\frac{-\frac{6}{11} + \frac{26}{5}}{1 + (-\frac{6}{11})(\frac{26}{5})}\right) = 50.5^{\circ}$$