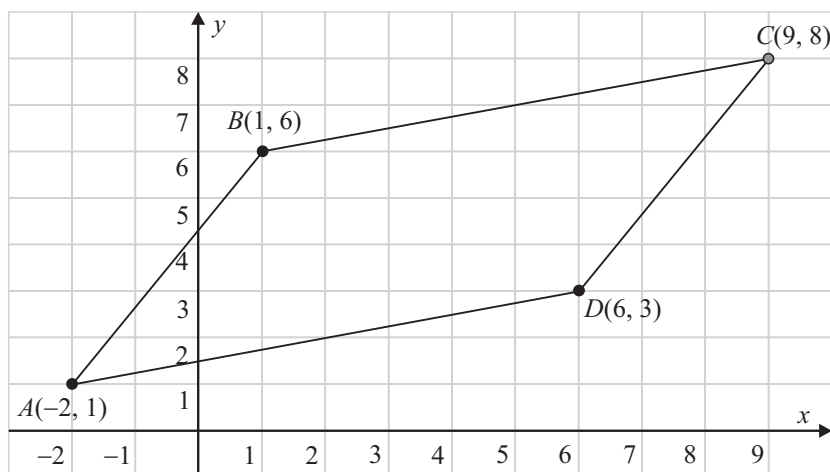


SAMPLE PAPER 4: PAPER 2

QUESTION 2 (25 MARKS)

Question 2 (a)



$$A(-2, 1) \rightarrow B(1, 6) \text{ [Add 3, Add 5]}$$

$$D(6, 3) \rightarrow C(9, 8)$$

Question 2 (b)

$$A(-2, 1), D(6, 3)$$

$$m = \frac{3-1}{6-(-2)} = \frac{2}{8} = \frac{1}{4} \quad \boxed{m = \frac{y_2 - y_1}{x_2 - x_1}}$$

$$\text{Slope of } BE: m = -4$$

$$\boxed{\text{Perpendicular lines: } m_1 \times m_2 = -1}$$

$$\text{Equation of } BE: B(1, 6), m = -4 \quad \boxed{y - y_1 = m(x - x_1)}$$

$$y - 6 = -4(x - 1)$$

$$y - 6 = -4x + 4$$

$$4x + y - 10 = 0$$

Question 2 (c)

$$\text{Equation of } AD: A(-2, 1), m = \frac{1}{4}$$

$$y - 1 = \frac{1}{4}(x - (-2))$$

$$4(y - 1) = 1(x + 2)$$

$$4y - 4 = x + 2$$

$$0 = x - 4y + 6$$

Solve simultaneously the equations for AD and BE .

$$4x + y = 10 \dots (1) \times 4$$

$$x - 4y = -6 \dots (2)$$

$$16x + 4y = 40$$

$$x - 4y = -6$$

$$\hline 17x = 34 \Rightarrow x = 2$$

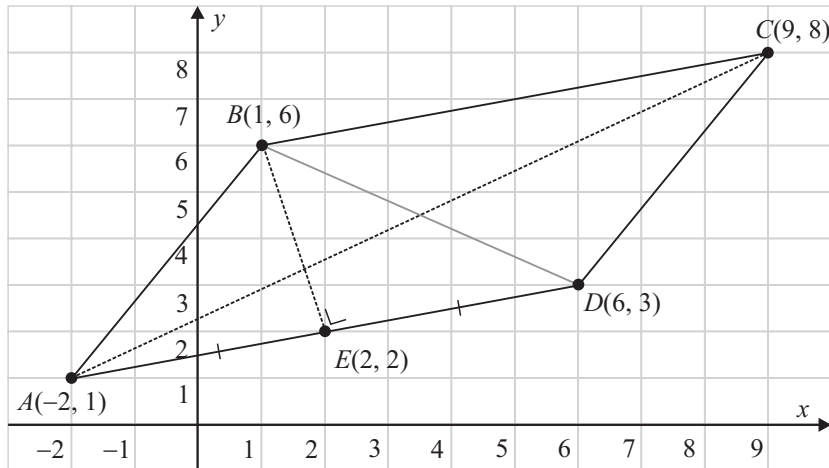
$$x = 2 : 4(2) + y = 10 \Rightarrow y = 2$$

Point of intersection of BE and AD : $E(2, 2)$

Midpoint of $[AD]$: $A(-2, 1), D(6, 3)$

$$\text{MP} = \left(\frac{-2+6}{2}, \frac{1+3}{2} \right) = (2, 2) \quad \boxed{\text{MP} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)}$$

Question 2 (d)



METHOD 1:

Area of a parallelogram: $\text{Area} = b \times h$

$$\text{Area} = b \times h = |AD| \times |BE|$$

$$|AD| = \sqrt{(6 - (-2))^2 + (3 - 1)^2} = \sqrt{8^2 + 2^2} = \sqrt{64 + 4} = \sqrt{68} = \sqrt{4 \times 17} = 2\sqrt{17}$$

$$|BE| = \sqrt{(1 - 2)^2 + (6 - 2)^2} = \sqrt{(-1)^2 + 4^2} = \sqrt{1 + 16} = \sqrt{17}$$

$$\therefore \text{Area} = |AD| \times |BE| = 2\sqrt{17} \times \sqrt{17} = 2(17) = 34$$

METHOD 2:

The diagonal $[BD]$ bisects the area of the parallelogram.

$$\text{Area} = 2 \times |\Delta ABD|$$

$$A(-2, 1) \rightarrow (0, 0) \text{ [Add 2, Subtract 1]} \quad A = \frac{1}{2} |x_1 y_2 - x_2 y_1|$$

$$B(1, 6) \rightarrow (3, 5)$$

$$D(6, 3) \rightarrow (8, 2)$$

$$\text{Area} = 2 \times \frac{1}{2} |(3)(2) - (5)(8)| = |6 - 40| = |-34| = 34 \text{ square units}$$