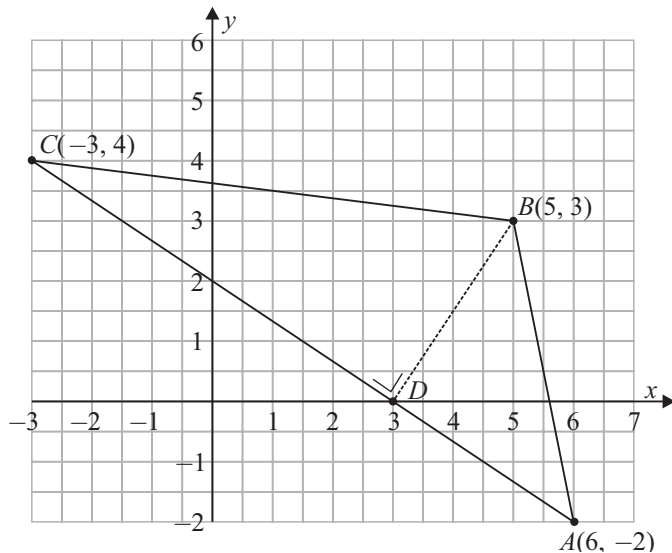


LC 2016 (SET A): PAPER 2

QUESTION 1 (25 MARKS)

Question 1 (a)

Points: $A(6, -2)$, $B(5, 3)$, $C(-3, 4)$



FORMULAE AND TABLES BOOK
Co-ordinate geometry: Line

Slope of PQ [page 18]

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
 Equation of PQ [page 18]

$$y - y_1 = m(x - x_1)$$

$$\text{Slope of } AC = \frac{4 - (-2)}{-3 - 6} = \frac{6}{-9} = -\frac{2}{3}$$

$$\text{Slope of } BD = \frac{3}{2}$$

$$\text{Equation of } BD: (x_1, y_1) = B(5, 3), m = \frac{3}{2}$$

$$(y - 3) = \frac{3}{2}(x - 5)$$

$$2y - 6 = 3x - 15$$

$$3x - 2y - 9 = 0$$

MARKING SCHEME NOTES

Question 1 (a) [Scale 10C (0, 3, 7, 10)]

- 3:**
- slope formula with some relevant substitution
 - $3 = 5m + c$
 - $y - y_1 = m(x - x_1)$ with x_1 or y_2 or both substituted
- 7:**
- perpendicular slope
 - equation of line through B parallel to AC

Question 1 (b)

BD is an altitude (height). The orthocentre is the intersection of the altitudes. Find the equation of another altitude, say the line from C perpendicular to AB .

$$\text{Slope of } AB = \frac{3 - (-2)}{5 - 6} = \frac{5}{-1} = -5$$

$$\text{Perpendicular slope of } AB = \frac{1}{5}$$

$$\text{Equation of altitude: } (x_1, y_1) = C(-3, 4), m = \frac{1}{5}$$

$$(y - 4) = \frac{1}{5}(x - (-3))$$

$$5y - 20 = x + 3$$

$$x - 5y + 23 = 0$$

Find the point of intersection of the equations of the two altitudes:

$$3x - 2y = 9 \dots (1)$$

$$x - 5y = -23 \dots (2) (\times -3)$$

$$3x - 2y = 9$$

$$\underline{-3x + 15y = 69}$$

$$13y = 78 \Rightarrow y = 6$$

Into (2): $x - 5(6) = -23 \Rightarrow x = 30 - 23 = 7$

Orthocentre = (7, 6)

MARKING SCHEME NOTES

Question 1 (b) [Scale 15D (0, 4, 7, 11, 15)]

- 4:**
- demonstration of understanding of orthocentre (e.g. mentions altitude)
 - slope formula with some relevant substitution
 - altitude from part (a)
- 7:**
- equation of an altitude other than (a)
 - some relevant substitution towards finding a second altitude and altitude from (a)
 - correct construction
- 11:**
- two correct altitudes
 - correct construction with orthocentre (7, 6)