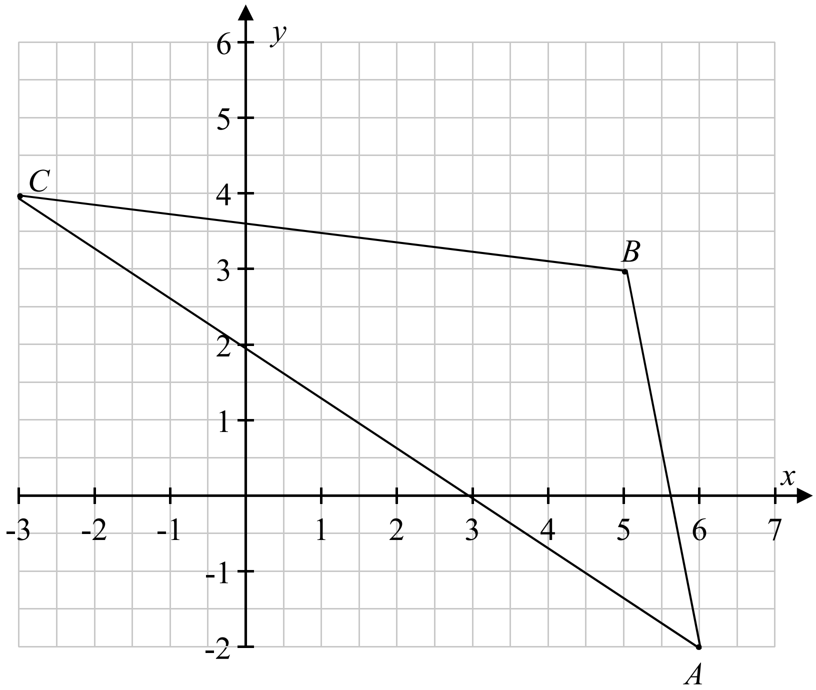
Question 1 **(25 marks)**

The points $A(6, -2)$, $B(5, 3)$ and $C(-3, 4)$ are shown on the diagram.

(a) Find the equation of the line through B which is perpendicular to AC.



(b) Use your answer to part **(a)** above to find the co-ordinates of the orthocentre of the triangle ABC.

Q1	Model Solution – 25 Marks	Marking Notes
(a)	Slope $AC = -\frac{2}{3}$ perp. slope $= \frac{3}{2}$ $y - 3 = \frac{3}{2}(x - 5)$ $3x - 2y = 9$	Scale 10C (0, 3, 7, 10) *Low Partial Credit* • slope formula with some relevant substitution • 3 = 5*m*+*c* • $y - y_1 = m(x - x_1)$ with x_1 or y_1 or both substituted *High Partial Credit* • perpendicular slope • equation of line through *B* parallel to *AC*
(b)	Point of intersection of the altitudes Slope $AB = \frac{3+2}{5-6} = -\frac{5}{1}$ perp. slope $= \frac{1}{5}$ $y - 4 = \frac{1}{5}(x + 3)$ $x - 5y + 23 = 0$ Orthocentre: $3x - 2y = 9 \cap x - 5y = -23$ $\Rightarrow y = 6 \quad x = 7$ $(7, 6)$ **or** If BC chosen: Slope $BC = \frac{3-4}{5+3} = -\frac{1}{8}$ perp. slope $= 8$ Equation of altitude: $y + 2 = 8(x - 6)$ Equation: $8x - y = 50$ Orthocentre: $3x - 2y = 9 \cap 8x - y = 50$ $\Rightarrow y = 6 \quad x = 7$ $(7, 6)$	Scale 15D (0, 4, 7,11,1 5) *Low Partial Credit* • demonstration of understanding of orthocentre (e.g. mentions altitude) • slope formula with some relevant substitution • altitude from part **(a)** *Mid Partial Credit* • equation of an altitude other than **(a)** • some relevant substitution towards finding a second altitude and altitude from **(a)** • correct construction *High Partial Credit* • two correct altitudes • correct construction with orthocentre (7, 6)