

Solution:

(a) Let the point B be represented by  $(b, 0)$  on x-axis

$$m_{AB} = \frac{0-2}{b-8} = 1, \quad -2 = b-8, \quad b = 8-2, \quad b = 6 \therefore B(6, 0)$$

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(b) Let  $C(c, 0)$

$$AB = AC$$

$$\sqrt{(6-8)^2 + (0-2)^2} = \sqrt{(c-8)^2 + (0-2)^2}$$

$$\sqrt{(-2)^2 + (-2)^2} = \sqrt{c^2 - 16c + 64 + (-2)^2}$$

$$\sqrt{8} = \sqrt{c^2 - 16c + 68}$$

Squaring both sides we get:  $8 = c^2 - 16c + 68$

$$c^2 - 16c + 60 = 0 \quad \text{Factoring: } (c-10)(c-6) = 0$$

$$c-10=0 \quad \text{OR} \quad c-6=0$$

$$c=10 \quad \text{OR} \quad c=6$$

Since C is to the right of B,  $C(10, 0)$

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(c)  $m_{AC} = \frac{0-2}{10-8} = \frac{-2}{2} = -1$

$\therefore$  The equation of the line through AC is of the form  $y = -x + k$ , where  $k$  is the y-intercept.

Since  $C(10, 0)$  lies on the line, it will satisfy the equation of the line:

$$0 = -10 + k, \quad k = 10$$

$\therefore$  y-intercept is 10 and the coordinates of D are  $(0, 10)$