3a) For D to describe (AB), then its coordinates must satisfy the eqn of (AB)

$y_D \stackrel{?}{=} x_D + 2$ $\quad\quad$ $D(4m-2; 4m)$

$4m \stackrel{?}{=} 4m - 2 + 2$

$4m = 4m$

Thus, verified.

b) In $\triangle BCD$ we have:

D belongs to (AB) (proved)

$(CA) \perp (AB)$ (proved)

& [CA) is the bisector of $\hat{BCD}$ (given)

so, $\triangle CBD$ is isosceles at C (having a height as a bisector)

then, [CA) is a median relative to [BD]

hence A is the midpt of [BD]

$x_A = \frac{x_B + x_D}{2}$ & $y_A = \frac{y_B + y_D}{2}$

$2x_A = x_B + x_D$ $\quad\quad$ $2y_A = y_B + y_D$

$x_D = 2x_A - x_B$ $\quad\quad$ $y_D = 2y_A - y_B$

$x_D = 2$ $\quad\quad$ $4m = 4 - 0$

so, $4m - 2 = 2$ $\quad\quad$ $\boxed{m = 1}$

$\boxed{m = 1}$

4) $\triangle ABC$ is right at A (proved)

So, (C) admits I, the midpt of [BC] as a center

& [AI] as a radius.

Thus, radius of (C) = $AI = \sqrt{10}$ cm.

5a) $a_{(EI)} = \frac{y_I - y_E}{x_I - x_E}$

$\frac{-1 - b}{+1 - a}$.