is the midpt of the hypotenuse [BC]

then $x_I = \frac{x_B + x_C}{2}$ | $y_I = \frac{y_B + y_C}{2}$

$= \frac{2+0}{2}$ | $= \frac{3-3}{2}$

$x_I = 1$ | $y_I = 0$

Thus, $\boxed{I(1,0)}$

Radius of (e) is

$r = \frac{BC}{2}$

$BC = \sqrt{(x_B - x_C)^2 + (y_B - y_C)^2}$

$= \sqrt{2^2 + 6^2}$

$= \sqrt{40} = 2\sqrt{10}$

Thus, $\boxed{r = \sqrt{10} \text{ cm}}$

3) a) $(3-\sqrt{10})^2 = 3^2 - 2(\sqrt{10})(3) + (\sqrt{10})^2$

$= 9 - 6\sqrt{10} + 10$

$= 19 - 6\sqrt{10}$.

$IF = \sqrt{19 - 6\sqrt{10}}$

$= \sqrt{(3-\sqrt{10})^2}$ but $3 - \sqrt{10} < 0$

Thus, $IF = opp(3 - \sqrt{10})$

$\boxed{IF = (\sqrt{10} - 3) \text{cm}}$

b) To determine relative position of F w.r.t (e)

we find $IF - r = (\sqrt{10} - 3) - \sqrt{10}$

$= -3$

So, $IF - r < 0$.

hence $IF < r$

Thus, $\boxed{F \text{ is inside } (e)}$

Ex-3. 1) $p(x) = (x+1)(x+2)(x-3) + 3(x+2)$

$= (x+2)[(x+1)(x-3) + 3]$

$= (x+2)[x^2 - 2x - 3 + 3]$

$= (x+2)(x^2 - 2x)$

Thus, $\boxed{p(x) = x(x+2)(x-2)}$

2a) $A(x) = p(x) - E(x)$

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

$= x(x+2)(x-2) - 2(x-2)(x+2)$

$= (x-2)(x+2)[x-2]$

Thus, $\boxed{A(x) = (x+2)(x-2)^2}$

b) $A(x) = 0$

$(x+2)(x-2)^2 = 0$

So, $x = -2$ or $x = 2$.