a)

$\Pr\left[\text{resp}_i = 0\right]$ active; β_2

Sol: $\Pr\left[\text{resp}_i = 1\right] = \dfrac{\exp\left(\beta_0 + \beta_1\, male_i + \beta_2\, active_i + \beta_3\, age_i + \beta_2\left(\frac{age_i}{10}\right)\right)}{1 + \exp\left(\beta_0 + \beta_1\, male_i + \beta_2\, active_i + \beta_3\, age_i + \beta_4\left(\frac{age_i}{10}\right)\right)}$

$= \dfrac{\exp\left(-2.488 + 0.954(1) + 0.914(1) + 0.07(50) - 0.069\frac{50^2}{10}\right)}{1 + \exp\left(-2.488 + 0.954(1) + 0.912(1) + 0.07(50) - 0.069\frac{50^2}{10}\right)}$

$= \underline{0.761}$

$\Pr\left(\text{resp}_i = 0\right) = 1 - \Pr\left[\text{resp}_i = 1\right]$

$= 1 - 0.761$

$= \underline{0.239}$

Elasticity $= 0.239 \times 1 \times 0.761$

$= \underline{0.218}$

when (activity = 0) then elasticity becomes zero

Since active = 0 ⊚

b) $\dfrac{\Pr\left[\text{resp}_i = 1 | active_i = 1\right] - \Pr\left[\text{resp}_i = 1 | active_i = 0\right]}{\Pr\left[\text{resp}_i = 1 | active_i = 0\right]}$

From

$\dfrac{\left(\dfrac{XY}{1 + XY}\right) - \left(\dfrac{X}{1 + X}\right)}{\left(\dfrac{X}{1 + X}\right)}$

$$\frac{S_2^i}{2}$$

$$e$$

multiply by $\left(\frac{1+x}{x}\right)$

$$\frac{\left[\dfrac{x4}{1+x4} - \dfrac{x}{1+x}\right]\left(\dfrac{1+x}{x}\right)}{\left(\dfrac{x}{1+x}\right)\left(\dfrac{1+x}{x}\right)}$$

$$= \frac{x4(1+x)-1}{x(1+x4)} = \frac{4-1}{1+x4}$$

$$= \exp(\beta_2 \text{ active}_i) - 1$$

$$\overline{1 + \exp\left(\beta_0 + \beta_1 \text{ male} + \beta_2 \text{ active}_i + \beta_3 \text{ age} + \beta_4 \left(\text{age}/10\right)^2\right)}$$

$$= \exp(\beta_2 \text{ active}) - 1 \qquad P_i [\text{resp}_i = 0 | \text{active} = 1]$$

Since active $= 1$

(or)

$$= \exp(\beta_2) - 1 \qquad P_r [\text{resp}_i = 0 | \text{active} = 1]$$

c)

$$\Rightarrow (\exp(0.91)-1) \; \frac{1}{1+\exp\left(-2.49 + 0.95 + 0.91 + 0.07 \times 50 - 0.07 \times \left(\frac{50}{10}\right)^2\right)}$$

$$= 1.48 \times 0.24 = \underline{0.3552}$$