HW1028_03.

$$P(Y=1 \mid x_1, x_2) = \frac{1}{1+\exp(-(\beta_0+\beta_1 x_1+\beta_2 x_2))}$$

x_1 = hours studied, x_2 = undergrad GPA.

(a) $x_1 = 40$, $x_2 = 3.5$

$$p = \frac{1}{1+\exp(-(-6+0.05\cdot 40+1\cdot 3.5))} = \frac{1}{1+\exp(0.5)} \approx \frac{1}{1+1.6487} \approx \frac{1}{2.6487} \approx 0.3775$$

Ans = 37.75%.

(b) $x_1 = h$.

$$p = \frac{1}{1+\exp(-0.05h+2.5)} = 0.5$$

$$1+\exp(-0.05h+2.5) = 2$$

$$\exp(-0.05h+2.5) = 1$$

$$2.5 - 0.05h = 1$$

$$0.05h = 2.5$$

$$h = \frac{2.5}{0.05} = 50$$

Ans = 50 hours.