X_1 = Hours studied
X_2 = undergrad GPA

$\hat{\beta_0} = -6$
$\hat{\beta_1} = 0.05$
$\hat{\beta_2} = 1$

(6)

X_1 = Hours Studied $\quad \hat{\beta_0} = -6 \quad \hat{\beta_2} = 1$
X_2 = Undergrad GPA $\quad \hat{\beta_1} = 0.05$

$P(X)$ = Probability that a student gets an A

Multiple Logistic Regression

$$P(X) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2}} =$$

(A) $X_1 = 40$
$X_2 = 3.5$

$$P(X) = \frac{e^{(-6) + 0.05(40) + 1(3.5)}}{1 + e^{(-6) + 0.05(40) + 1(3.5)}} = \frac{e^{-0.5}}{1 + e^{-0.5}} = \frac{0.60}{1.60} = 0.375 = 37.5\%$$

(B) $P(X) = 50\% = 0.50$

$$0.50 = \frac{e^{(-6) + 0.05(X_1) + 1(3.5)}}{1 + e^{(-6) + 0.05(X_1) + 1(3.5)}}$$

$$0.50 + 0.50e^{(-2.5 + 0.05X_1)} = e^{(-2.5 + 0.05X_1)}$$

$$0.50 = e^{(-2.5 + 0.05X_1)}$$

$$\log(1) = -2.5 + 0.05X_1$$

$$X_1 = \frac{-2.5}{0.05} = -50$$