3.1

a. $\begin{cases} H_0: \beta_2 = 0 \\ H_1: \beta_2 > 0 \end{cases}$

b. $t = b_2 / se(b_2) \sim t(62)$

c. shift to right

d. $t_{62,0.9} = 2.388.$

If $t > 2.388$, we reject H_0.

If $t < 2.388$ we fail to reject H_0.

e. $t = \frac{0.01309}{0.00215} = 6.088 > 2.388$

We reject H_0, Medals and GDPB is significantly positive.

3.7

(a)

$$\frac{a}{2.672} = 4.31 \quad , \quad a = 11.51632$$

(b)

Income and Bachelor is increasing at constant rate.

(c)

$$t = \frac{1.029}{c} = 10.75, \quad c = 0.0957$$

(d)

$$t = \frac{11.51632 - 10}{2.092} = 0.5675$$

(e)

$$t \geq 2.0096 \ , \ t \leq -2.0096$$

(f)

$$1.029 \pm t_{69,\,0.005} \times Se$$

$$= [0.7725 \ , \ 1.2855]$$

(g)

$$\begin{cases} H_0 : \beta_2 = 1 \\ H_1 : \beta_2 \neq 1 \end{cases} \qquad \frac{1.029 - 1}{0.0957} = 0.3030 < t_{0.025,\,4}$$

3.17

(a) $\begin{cases} H_0 : \beta_1 = 1.8 \\ H_1 : \beta_1 > 1.8 \end{cases}$

$$t = \frac{2.46 - 1.8}{0.16} = 4.125$$

$$t_{984,0.05} = 1.6464$$

$4.125 > 1.6464$, so, we reject H_0

(b) $\mu = -4.58 + 1.8 \times 16 = 23.92$

$$\mu \pm t_{(212,0.025)} \times Se = [22.28, 25.53]$$

$$Se(Wage) = \sqrt{Se(\hat{\beta}_0)^2 + (EDUC)^2 Se(\hat{\beta}_1)^2 + 2 \cdot EDUC \cdot Cov(\beta_0, \beta_1)}$$

$$= -0.761$$

(c)

$$\mu = -10.76 + 2.46 \times 16 = 28.6$$

$$Se(Wage) = \sqrt{(1.27)^2 + (16)^2 \times (0.16)^2 + 2 \times 16 \times (-0.1491)}$$

$$= 0.8164$$

$$\mu \pm t_{(0.05)} \times se = 28.6 \pm 1.96 \times 0.8164 = [27.00, 30.20]$$

d

$H_0 : \beta_1 \geq 4$

$H_1 : \beta_1 < 4$

$$t = \frac{-6.88 - 4}{3.24} = -2.6991 < t_{(212,0.01)} = -2.3441$$