2.4b) $t^* = \frac{b_1}{s\{b_1\}}$

$s^2\{b_1\} = \frac{MSE}{\Sigma(X_i - \bar{X})^2} = \frac{0.388}{2379.925} = 1.63 \times 10^{-4}$

$MSE = 0.388$

$t^* = \frac{0.039}{\sqrt{1.63 \times 10^{-4}}} = 3.05$

$3.05 > t(1 - 0.01/2; 118)$ 2.62, $H_1 = True$

alternatives

$H_0: B_1 = 0$

$H_1: B_1 \neq 0$

decision rule

$|t^*| \leq 2.86$, $H_0 = True$

$|t^*| > 2.86$, $H_1 = True$

2.4c)

P-value $= 0.0028$

Since $0.0028 < 0.01$, we can conclude H_1

2.6 b)

alternatives	decision rule
$H_0: B_1 = 0$	$\lvert t^* \rvert \leq t(1-0.05/2; 10-2) = 2.306$, $H_0 = T$
$H_1: B_1 \neq 0$	$\lvert t^* \rvert > 2.306$, $H_1 = \text{True}$

$$t^* = \frac{b_1}{s\{b_1\}} = \frac{4}{\sqrt{0.22}} = 8.53 > 2.306, \quad H_1 = \text{True}$$

$s^2\{b_1\} = 0.22$

p-value $= 2.75 \times 10^{-5}$

Since $2.75 \times 10^{-5} < 0.05$, we can conclude H_1

2.14 a)

$\hat{Y} = 89.6$

confidence interval $= (87.29, 91.98)$

$$87.29 \leq E\{Y_h\} \leq 91.98$$

2.27a)

$\hat{Y} = 156.35 - 1.19X$

alternatives	decision rule
$H_0: B_1 \geq 0$	H_0 = True if $t^* \geq -1.67$
$H_1: B_1 < 0$	H_1 = True if $t^* < -1.67$

$t^* = -13.19 < -1.67$. Thus H_1 = True

P-score $= 2.06 \times 10^{-19} = 0^+$

b)

No, it cannot because the data set/scope of the model does not include newborns (or $X=0$).

2.27c)

$$t(0.975, 58) = 2.0017$$

$$b_1 = -1.19$$

$$-1.19 - (2.0017 \cdot 0.0902) \leq \beta_1 \leq -1.19 + (2.0017 \cdot 0.0902)$$

$$-1.37 \leq \beta_1 \leq -1.01$$

It's not important to know the specific ages for this estimate because we use the slope, t value, & the se. of the slope to get our estimate. And since the slope is the average of our data as a whole, we know then with 95% confidence that women whose age differs by one year has decreased muscle mass between -1.37 & -1.01

2.65)

Infection Risk $= X_1$

$0.534 \leq B_1 \leq 0.987$

Available facilities & services $= X_2$

$0.023 \leq B_1 \leq 0.067$

Routine Chest X-ray $= X_3$

$0.021 \leq B_1 \leq 0.055$

The X_2 & X_3 variables seem to have a similar slope & confidence interval at 95%. But Infection risk's slope is larger than the others