## *Exercise*

Find a prediction interval data listed below.

| Cost of Pizza | 0.15 | 0.35 | 1.00 | 1.25 | 1.75 | 2.00 |
|---|---|---|---|---|---|---|
| Subway Fare | 0.15 | 0.35 | 1.00 | 1.35 | 1.50 | 2.00 |

Using: *Cost of a slice of pizza:* \$0.75; 99% *confidence*

***Solution***

The predicted values (from Excel):

| | *Coefficients* |
|---|---|
| Intercept | 0.03456017 |
| X Variable 1 | 0.94502138 |

$$\hat{y} = 0.034560 + 0.945021x$$

$$\hat{y}\big|_{0.75} = 0.034560 + 0.945021(0.75)$$

$$= 0.743$$

$\alpha = 0.01 \quad and \quad df = n - 2 = 4$

$t_{\alpha/2} = t_{0.005} = 4.604$

**TABLE A-3** *t* Distribution: Critical *t* Values

| | Area in One Tail | | | | |
|---|---|---|---|---|---|
| | 0.005 | 0.01 | 0.025 | 0.05 | 0.10 |
| Degrees of Freedom | Area in Two Tails | | | | |
| | 0.01 | 0.02 | 0.05 | 0.10 | 0.20 |
| 4 | **4.604** | 3.747 | **2.776** | 2.132 | 1.533 |

$$E = t_{\alpha/2} s_e \sqrt{1 + \frac{1}{n} + \frac{n\left(x_0 - \bar{x}\right)^2}{n\left(\sum x^2\right) - \left(\sum x\right)^2}}$$

$$= (4.604)(0.122987)\sqrt{1 + \frac{1}{6} + \frac{6(0.75 - 1.083333)^2}{6(9.77) - (6.5)^2}}$$

$$\approx 0.622$$

$\hat{y} - E < y < \hat{y} + E$

$0.743 - 0.622 < y_{0.75} < 0.743 + 0.622$

$\$0.12 < y_{0.75} < \$1.37$