# 2.9

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(a) Var(Y) = (SSR + SSE)/(n − 1) = 0.0050, Cor$(Y, X)$ is the positive square root of $R^2$ (positive because $\hat{\beta}_1 > 0$ ), which is 0.631.

(b) The estimated participation rate would be $0.203311 + 0.656040(0.45) = 0.4985$.

(c) With $\alpha = .05, n = 19$, and the information provided in Table 2.10, we may employ formula (2.38) to obtain the 95 percent confidence interval for our prediction in part (b). The result is $0.4985 \pm 2.11(0.0566)\sqrt{1 + \frac{1}{19} + \frac{(0.45-.5)^2}{18 \cdot \mathrm{Var}(X)}} = .4985 \pm .1241$.

(d) We may use the computer output and formula (2.34) to obtain $0.6560 \pm\ 2.11(0.1961) = 0.6560 \pm 0.4137$ as the 95 percent confidence interval for $\beta_1$.

(e) The critical value for the test statistic is 1.74. However, we can see that the test statistic will be negative without actually computing it; therefore, we may automatically conclude that the null hypothesis will not be rejected.

(f) $R^2$ would not change because $R^2 = (\mathrm{Cor}(Y, X))^2$ and $\mathrm{Cor}(Y, X) = \mathrm{Cor}(X, Y)$.