Q1

$$t = \frac{\hat{\beta}_1 - 0}{SE(\hat{\beta}_1)} \quad (3.14)$$

p67

t-statistic

$H_0: \beta_1 = 0$ - null hypothesis

$H_a: \beta_1 \neq 0$ - alternative hypothesis

- If the denominator $SE(\hat{\beta}_1)$ is small, we can be confident $\hat{\beta}_1 \neq 0$
- If $SE(\hat{\beta}_1)$ is large, $|\hat{\beta}_1|$ must be large.

t-statistics measures number of standard deviations β1 is from zero.

$\boxed{\text{Notes}}$

$$SE(\hat{\beta}_1)^2 = \frac{\sigma^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

This more spread out the x's, the smaller the standard error.

Determine the $\hat{\beta}_1$ estimate for β_1 actual that is sufficiently far from zero so that we're confident that it's not zero

Small p-value indicates that it is unlikely to observe substantial association between predictor and response due to chance. p67

Want p-value <= 0.05, 5%
For n=30, t-statistic = 2 is good.

Ch3, Q1

$\boxed{\text{Answer}}$

	Coefficient	Std. error	t-statistic	p-value
Intercept	2.939	0.3119	9.42	< 0.0001
TV	0.046	0.0014	32.81	< 0.0001
radio	0.189	0.0086	21.89	< 0.0001
newspaper	−0.001	0.0059	−0.18	0.8599

Table 3.4

p74

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Is mentioning t-statistic important?

TV: 0.46 x $1000 = $46 sales for every $1000 in ad spending

radio: 0.189 x $1000 = $189 in sales

newspaper has no effect on sales because p-value too high:
0.8599 - 86%