§8.3 #11 Given:

$$\begin{cases} H_0: \mu_d \le 0 \\ H_a: \mu_d > 0 \end{cases}$$

claim → $H_a: \mu_d > 0$

$n = 10$

$\left.\begin{array}{l}\alpha = 0.01 \\ \text{d.f.} = 9\end{array}\right\} \rightarrow$ critical value $t_0 = 2.821$

rejection region

$\boxed{t > 2.821}$

Excel: $\begin{cases} \bar{d} = 0.097 \\ s_d \approx 0.043 \end{cases}$

Test statistic: $\frac{s_d}{\sqrt{n}} = \frac{0.043}{\sqrt{10}} = 0.01359$

$$t = \frac{\bar{d} - \mu_d}{s_d/\sqrt{n}} = \frac{0.097 - 0}{0.01359}$$

$$= 7.1376$$

Therefore we reject Ho.

"There is enough evidence to support the claim."

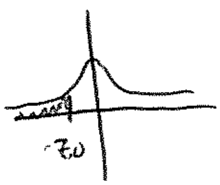
$\boxed{\S 8.4 \ \#12}$

$$\begin{cases} H_0: p_1 \geq p_2 \\ H_a: p_1 < p_2 \end{cases}$$

claim $\rightarrow$ H_a

$\alpha = 0.10$

$\downarrow$



$z_0 = -1.28$

$\downarrow$

$\boxed{\text{Rej rg}: z < -1.28}$

Midwest	West
$n_1 = 340$	$n_2 = 300$
$\hat{p}_1 = \frac{289}{340} = 0.85$	$\hat{p}_2 = \frac{282}{300} = 0.94$

$\downarrow$

Test statistic

$$\bar{p} = \frac{289 + 282}{340 + 300} = 0.8921$$

$$\bar{q} = 1 - \bar{p} = 0.1079$$

$$\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)} = \sqrt{(0.8921)(0.1079)\left(\frac{1}{340} + \frac{1}{300}\right)}$$

$$= 0.02457$$

$$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{(0.85 - 0.94) - 0}{0.02457}$$

$$= -3.663$$

Therefore reject Ho.

"There is evidence to support the claim."

§9.1

(#11) perfect negative linear correlation

(#13) strong positive linear correlation

§9.2

From the Excel file:

	Coefficients
intercept	33.7453
X variable 1	7.451

← this is "b"

← this is "m"

Plug into "$y = mx + b$"
to get linear regression model

$$y = 7.451x + 33.7453$$

a) $x = 3 \rightarrow$

$$y = 7.451(3) + 33.7453 \approx 60$$

b) $x = 6.5 \rightarrow$

$$y = 7.451(6.5) + 33.7453 \approx 86$$

c) not meaningful ~ outside of data range

d) $x = 4.5 \longrightarrow y = 7.451(4.5) + 33.7453 \approx 71$