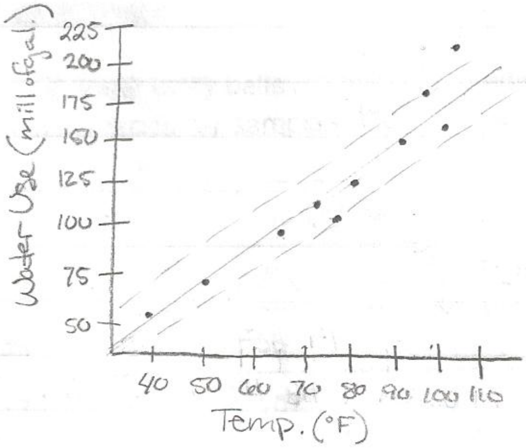
Makenna Linn

1.)



7.) — Regression
--- 95% CI

Strong positive correlation

2.) $$r = \frac{107786 - \frac{(772)(1279)}{10}}{\sqrt{\left[63610 - \frac{(772)^2}{10}\right]\left[186537 - \frac{(1279)^2}{10}\right]}} = \frac{9048}{\sqrt{(4011.6)(22952.9)}} = 0.9429$$

strong pos. correlation

3.) $y = b_0 + b_1 x$

$$b_1 = \frac{107786 - \frac{(772)(1279)}{10}}{63610 - \frac{(772)^2}{10}} = \frac{9047.2}{4011.6} = 2.25$$

$$b_0 = \frac{1279}{10} - (2.25)\left(\frac{772}{10}\right) = -45.8$$

$y = -45.8 + 2.25x$

4.)

$\hat{y}$	$y-\hat{y}$	$(y-\hat{y})^2$
185.95	33.05	1092.3
41.95	14.05	197.4
127.45	-20.45	418.2
129.7	-0.7	0.49
66.7	1.3	1.69
170.2	13.8	190.44
156.7	-6.7	44.89
122.95	-10.95	119.9
100.45	-1.45	2.1
176.95	-21.95	481.8
	Σ = 0.0	Σ 2549.21

$$r^2 = 1 - \frac{2549.21}{\left(186537 - \frac{(1279)^2}{10}\right)} = 0.89$$

5.) $x=40$ $\quad$ $x=60$ $\quad$ $x=80$

$-45.8+2.25(40) = 44.2$ $\quad$ 89.2 $\quad$ 134.2

6.) $CI=95\%$ $\quad$ $t = _{.025,8} \rightarrow 2.306$

$\alpha = 0.05$

$x = 40$

$\bar{x} = 77.2$

$S_e = 17.85$

$$44.2 \pm (2.306)(17.85)\sqrt{\frac{1}{10}+\frac{(40-77.2)^2}{(4011.6)}} = 44.2 \pm (2.306)(17.85)(0.6671)$$

44.2 ± 27.46

$16.74 < y < 71.66$

$x=60$ $$89.2 \pm (2.306)(17.85)\sqrt{\frac{1}{10}+\frac{(60-77.2)^2}{4011.6}} = 89.2 \pm (2.306)(17.85)(.4168)$$

89.2 ± 17.16

$72.04 < y < 106.36$

$x=80$ $$134.2 \pm (2.306)(17.85)\sqrt{\frac{1}{10}+\frac{(80-77.2)^2}{4011.6}} = 134.2 \pm (2.306)(17.85)(0.3193)$$

134.2 ± 13.14

$121.06 < y < 147.34$

8.) $H_0: \beta_1 = 0$ $\quad$ $\alpha = 0.05$

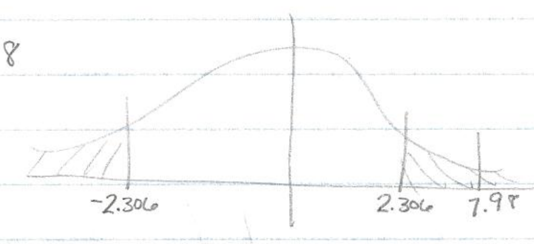
$H_a: \beta_1 \neq 0$ $\quad$ $b_1 = 2.25$

$S_e = 17.85$

$\Sigma x = 772$

$\Sigma x^2 = 63610$

$$t = \frac{2.25-0}{\frac{17.85}{\sqrt{4011.6}}} = \pm 7.98$$



Reject Hypothesis

9.) $t^2 = (7.98)^2 = 63.68$

10.) The model is very accurate. The model would be very useful if you wanted to predict water use at 20°-120°. There is a very strong positive correlation and y (water use) is very sensitive to x (temperature).

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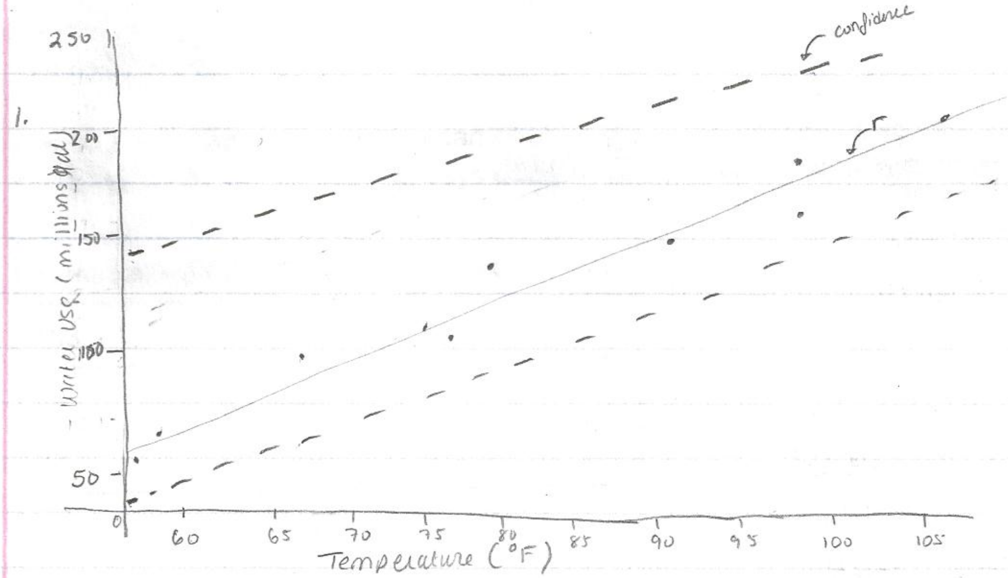
Antonia Osagie

1.



2.

x	y	x^2	y^2	xy
103	219	10609	47961	22557
39	56	1521	3136	2184
77	107	5929	11449	8239
78	129	6084	16641	10062
50	68	2500	4624	3400
96	184	9216	33856	17664
90	150	8100	22500	13500
75	112	5625	12544	8400
65	99	4225	9801	6435
99	155	9801	24025	15345
$\Sigma x = 772$	$\Sigma y = 1279$	$\Sigma x^2 = 63610$	$\Sigma y^2 = 186537$	$\Sigma xy = 107786$

$$r = \frac{\Sigma xy - \frac{(\Sigma x \Sigma y)}{n}}{\sqrt{\left[\Sigma x^2 - \frac{(\Sigma x)^2}{n}\right]\left[\Sigma y^2 - \frac{(\Sigma y)^2}{n}\right]}} = \frac{(107786) - \frac{((772)(1279))}{10}}{\sqrt{\left[63610 - \frac{(772)^2}{10}\right]\left[186537 - \frac{(1279)^2}{10}\right]}}$$

$$= \frac{9047.2}{\sqrt{(4011.6)(22952.9)}} = \underline{.942837}$$

3.

$$SSxy = \Sigma xy - \frac{(\Sigma x)(\Sigma y)}{n} = 107786 - \frac{(772)(1279)}{10} = 9047.2$$

$$SSxx = \Sigma x^2 - \frac{(\Sigma x)^2}{n} = 63610 - \frac{(772)^2}{10} = 4011.6$$

$$b_1 = \frac{SSxy}{SSxx} = \frac{9047.2}{4011.6} = 2.255$$

$$b_0 = \frac{\Sigma y}{n} - b_1 \frac{(\Sigma x)}{n} = \frac{1279}{10} - (2.255)\left(\frac{772}{10}\right) = -46.186$$

$$\hat{y} = \underline{-46.186 + 2.255x}$$

4.

$$r^2 = 1 - \frac{SSE}{\Sigma y^2 - \frac{(\Sigma y)^2}{n}} = 1 - \frac{2551.46}{186537 - \frac{(1279)^2}{10}} = \underline{\underline{.888839}}$$

$$SSE = \Sigma y^2 - b_0 \Sigma y - b_1 \Sigma xy$$

$$= 186537 - (-46.186)(1279) - (2.255)(107786)$$

$$= 2551.46$$

5. $x = 40, 60, 80$

$$\hat{y} = -46.186 + 2.255(40) = \underline{44.014}$$

$$= -46.186 + 2.255(60) = \underline{89.114}$$

$$= -46.186 + 2.255(80) = \underline{134.214}$$

6.

$$\hat{y} \pm t_{\alpha/2, n-2} \, S_e \sqrt{\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{SS_{xx}}} \qquad S_e = \sqrt{\frac{SSE}{n-2}} = \sqrt{\frac{2551.46}{10-2}} = 17.8587$$

$$\bar{x} = 77.2$$

$$44.014 \pm (2.306)(17.8587)\sqrt{\frac{1}{10} + \frac{(40 - 77.2)^2}{4011.6}} = (16.5433,\ 71.4847)$$

$$89.114 \pm (2.306)(17.8587)\sqrt{\frac{1}{10} + \frac{(60 - 77.2)^2}{4011.6}} = (71.9481,\ 106.28)$$

$$134.214 \pm (2.306)(17.8587)\sqrt{\frac{1}{10} + \frac{(80 - 77.2)^2}{4011.6}} = (121.064,\ 147.364)$$

-1 7. On graph.

8.

$$t = \frac{b_1 - \beta_1}{S_b} \qquad S_b = \frac{S_e}{\sqrt{SS_{xx}}} = \frac{17.8587}{\sqrt{4011.6}} = .281962$$

$H_0: \beta_1 = 0$ vs. $H_a: \beta_1 \neq 0$

$$\frac{2.255 - 0}{.281962} = 7.99$$

$$t^* = 2.306$$

$2.306 < 7.99$, Reject,

9.

$$F = t^2 = (7.99)^2 = \underline{\underline{63.8401}}$$

10.

The model is relatively accurate at 88.8%. It would not be very useful if you wanted a more accurate prediction for those values because they are far off from the data.