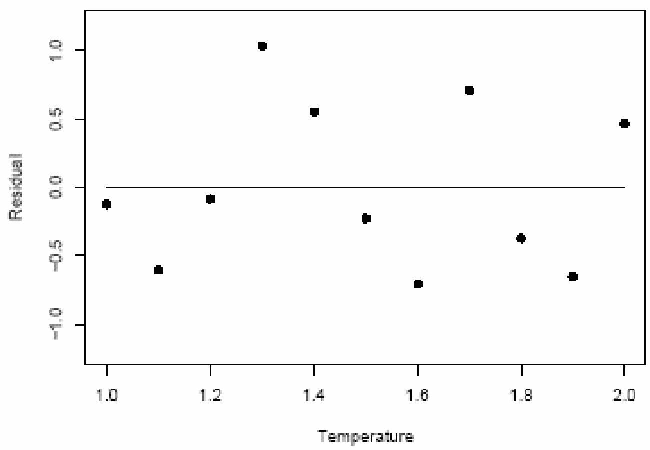
p 359 #3 $\sum_i x_i = 16.5$, $\sum_i y_i = 100.4$, $\sum_i x_i^2 = 25.85$, $\sum_i x_i y_i = 152.59$, $n = 11$. Therefore,

$$b = \frac{(11)(152.59) - (16.5)(100.4)}{(11)(25.85) - (16.5)^2} = 1.8091,$$
$$a = \frac{100.4 - (1.8091)(16.5)}{11} = 6.4136.$$

Hence $\hat{y} = 6.4136 + 1.8091x$

(b) For $x = 1.75$, $\hat{y} = 6.4136 + (1.8091)(1.75) = 9.580$.

(c) Residuals appear to be random as desired.

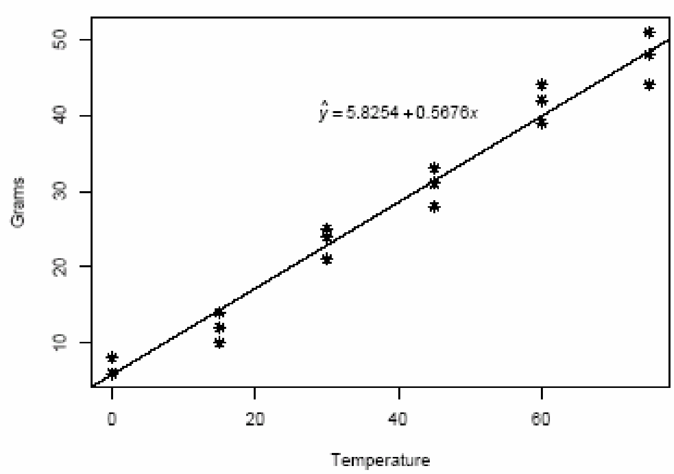


#5 (a) $\sum_i x_i = 675$, $\sum_i y_i = 488$, $\sum_i x_i^2 = 37,125$, $\sum_i x_i y_i = 25,005$, $n = 18$. Therefore,

$$b = \frac{(18)(25,005) - (675)(488)}{(18)(37,125) - (675)^2} = 0.5676,$$
$$a = \frac{488 - (0.5676)(675)}{18} = 5.8254.$$

Hence $\hat{y} = 5.8254 + 0.5676x$

(b) The scatter plot and the regression line are shown below.



(c) For $x = 50$, $\hat{y} = 5.8254 + (0.5676)(50) = 34.205$ grams.

p 371 #5 $S_{xx} = 25.85 - 16.5^2/11 = 1.1$, $S_{yy} = 923.58 - 100.4^2/11 = 7.2018$, $S_{xy} = 152.59 - (165)(100.4)/11 = 1.99$, $a = 6.4136$ and $b = 1.8091$.

(a) $s^2 = \frac{7.2018-(1.8091)(1.99)}{9} = 0.40$.

(b) Since $s = 0.632$ and $t_{0.025} = 2.262$ for 9 degrees of freedom, then a 95% confidence interval is

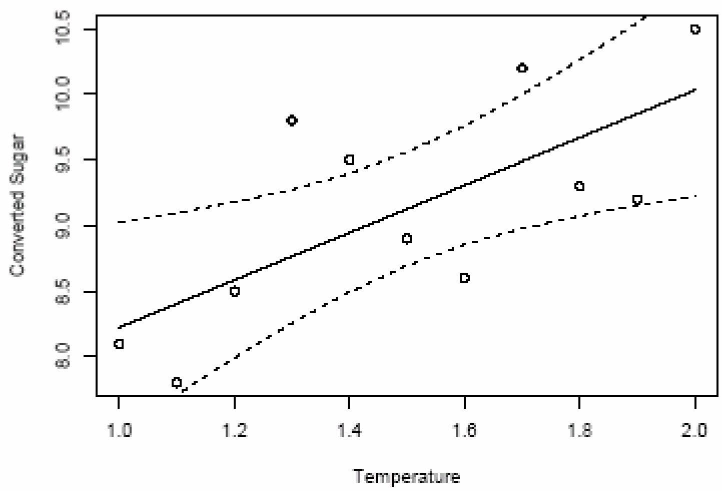
$$6.4136 \pm (2.262)(0.632)\sqrt{\frac{25.85}{(11)(1.1)}} = 6.4136 \pm 2.0895,$$

which implies $4.324 < \alpha < 8.503$.

(c) $1.8091 \pm (2.262)(0.632)/\sqrt{1.1}$ implies $0.446 < \beta < 3.172$.

#12 95% confidence bands are obtained by plotting the limits

$$(6.4136 + 1.809x) \pm (2.262)(0.632)\sqrt{\frac{1}{11} + \frac{(x-1.5)^2}{1.1}}.$$



#13 Using the value $s = 0.632$ from Exercise 11.19(a) and the fact that $y_0 = 9.308$ when $x_0 = 1.6$, and $\bar{x} = 1.5$, we have

$$9.308 \pm (2.262)(0.632)\sqrt{1 + \frac{1}{11} + \frac{0.1^2}{1.1}} = 9.308 \pm 1.4994$$

implies $7.809 < y_0 < 10.807$.

p 381 #6 The hypotheses are

H_0: The regression is linear in x,

H_1: The regression is nonlinear in x.

$\alpha = 0.05$.

Critical regions: $f > 3.26$ with 4 and 12 degrees of freedom.

Computations: $SST = S_{yy} = 3911.78$, $SSR = bS_{xy} = 3805.89$ and $SSE = S_{yy} - SSR = 105.89$. $SSE(\text{pure}) = \sum_{i=1}^{6}\sum_{j=1}^{3} y_{ij}^2 - \sum_{i=1}^{6} \frac{T_{i.}^2}{3} = 69.33$, and the "Lack-of-fit SS" is $105.89 - 69.33 = 36.56$.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	Computed f
Regression	3805.89	1	3805.89	
Error	105.89	16	6.62	
Lack of fit	36.56	4	9.14	1.58
Pure error	69.33	12	5.78	
Total	3911.78	17		

Decision: Do not reject H_0; the lack-of-fit test is insignificant.

p 396 #1 $S_{xx} = 36{,}354 - 35{,}882.667 = 471.333$, $S_{yy} = 38{,}254 - 37{,}762.667 = 491.333$, and $S_{xy} = 36{,}926 - 36{,}810.667 = 115.333$. So, $r = \frac{115}{\sqrt{(471.333)(491.333)}} = 0.240$.

#2 The hypotheses are

$$H_0: \rho = 0,$$
$$H_1: \rho \neq 0.$$

$\alpha = 0.05$.

Critical regions: $t < -2.776$ or $t > 2.776$.

Computations: $t = \frac{0.240\sqrt{4}}{\sqrt{1-0.240^2}} = 0.51$.

Decision: Do not reject H_0.