

Solution to Assignment No.4

11-5.

a)

$$\hat{y} = 13.3202 + 3.32437x$$

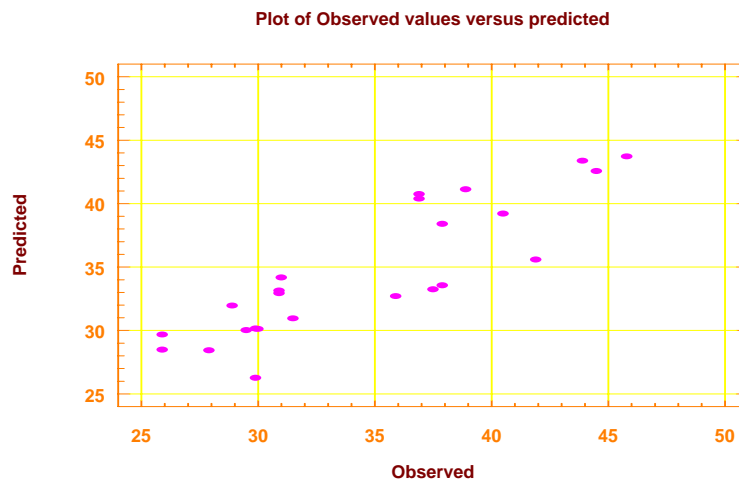
b) $\hat{y} = 13.3202 + 3.32437(7.5) = 38.253$

c) $\hat{y} = 13.3202 + 3.32437(5.8980) = 32.9273$

$$\hat{y} = 32.9273$$

$$e = y - \hat{y} = 30.9 - 32.9273 = -2.0273$$

d) All the points would lie along a 45 degree line. That is, the regression model would estimate the values exactly. At this point, the graph of observed vs. predicted indicates that the simple linear regression model provides a reasonable fit to the data.



11-6.

$$\hat{y} = -6.3355 + 9.20836x$$

b) $\hat{y} = -6.3355 + 9.20836(55) = 500.124$

c) If monthly temperature increases by 1°F, \hat{y} increases by 9.20836.

d) $\hat{y} = -6.3355 + 9.20836(47) = 426.458$

$$\hat{y} = 426.458$$

$$e = y - \hat{y} = 424.84 - 426.458 = -1.618$$

11-7.

a)

Predictor	Coef	StDev	T	P
Constant	33.535	2.614	12.83	0.000
x	-0.03540	0.01663	-2.13	0.047

S = 3.660 R-Sq = 20.1% R-Sq(adj) = 15.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	60.69	60.69	4.53	0.047
Error	18	241.06	13.39		
Total	19	301.75			

$$\hat{\sigma}^2 = 13.392$$

$$\hat{y} = 33.5348 - 0.0353971x$$

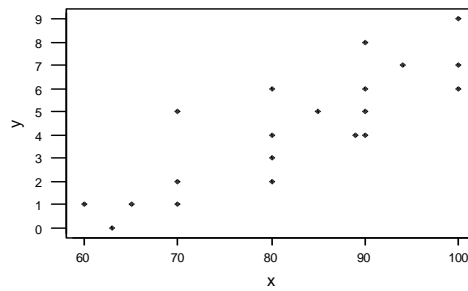
b) $\hat{y} = 33.5348 - 0.0353971(150) = 28.226$

c) $\hat{y} = 29.4995$

$$e = y - \hat{y} = 31.0 - 29.4995 = 1.50048$$

11-9.

a)



Yes, a linear regression would seem appropriate, but one or two points might be outliers.

Predictor	Coef	SE Coef	T	P
Constant	-10.132	1.995	-5.08	0.000
x	0.17429	0.02383	7.31	0.000

S = 1.318 R-Sq = 74.8% R-Sq(adj) = 73.4%

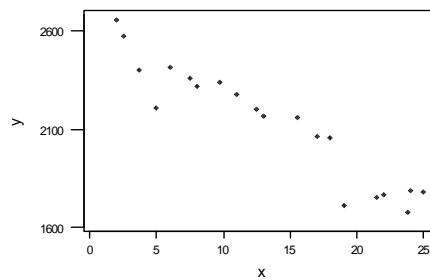
Analysis of Variance					
Source	DF	SS	MS	F	P
Regression	1	92.934	92.934	53.50	0.000
Residual Error	18	31.266	1.737		
Total	19	124.200			

b) $\hat{\sigma}^2 = 1.737$ and $\hat{y} = -10.132 + 0.17429x$

c) $\hat{y} = 4.68265$ at $x = 85$

11-12.

a)



Yes, a simple linear regression (straight-line) model seems plausible for this situation.

Predictor	Coef	StDev	T	P
Constant	2625.39	45.35	57.90	0.000
x	-36.962	2.967	-12.46	0.000

S = 99.05 R-Sq = 89.6% R-Sq(adj) = 89.0%

Analysis of Variance					
Source	DF	SS	MS	F	P
Regression	1	1522819	1522819	155.21	0.000
Error	18	176602	9811		
Total	19	1699421			

b) $\hat{\sigma}^2 = 9811.2$

$\hat{y} = 2625.39 - 36.962x$

c) $\hat{y} = 2625.39 - 36.962(20) = 1886.15$

d) If there were no error, the values would all lie along the 45° line. The plot indicates age is reasonable regressor variable.