PC Sec 2-2 p. 91 (1-11)

① A set of ordered pairs, (x, y), which can be described by the function $y = mx + b$ where m and b are constants.

② a) $m = \frac{334.50 - 1629}{0.12 - 0.35} = \frac{-1294.5}{-0.23} = 5628.26$

$y = 1629 + 5628.26(x - 0.35)$

$y = 1629 + 5628.26x - 1969.891$

$\boxed{y = 5628.26x - 340.89}$

b) The cost increased \$5628.26 for every one-carat increase.

c) $y = 5628.26(0.17) - 340.89 = \boxed{\$615.91}$

d) Interpolation

③ Observed, predicted

④ Higher

⑤ a) $y = 5000(0.29) - 250 = \boxed{\$1200}$

b) $R = \text{Obs} - \text{Pred} = 1290 - 1200 = \boxed{\$90}$

⑥ a) $y = 5000(0.21) - 250 = \boxed{\$800}$

b) $R = \text{obs} - \text{Pred} = 724.50 - 800 = \boxed{-\$75.50}$

⑦ First square each residual, then sum the squares.

⑧ a) $y = 5.2(1) - 3 = 2.2$ (predicted)

$R = \text{obs} - \text{Pred}$

$-0.2 = y - 2.2$

$+2.2 \qquad + 2.2$

$\boxed{y = 2.0 \text{ (observed)}}$

b) $y = 5.2(4) - 3 = 17.8$ (predicted)

$R = \text{Obs} - \text{Pred}$

$2.1 = y - 17.8$

$+17.8 \qquad + 17.8$

$\boxed{y = 19.9 \text{ (observed)}}$

c) $y = 5.2(3) - 3 = 12.6$ (predicted)

$R = \text{obs} - \text{Pred}$

$0 = y - 12.6$

$\boxed{y = 12.6 \text{ (observed)}}$

(9) a) Slope = 0.55 ; the number of states visited goes up by 0.55 with each one year increase in age.

b) 3 Predicted = 0.55(16) + 3.5 = $\boxed{12.3}$

R = Obs − Pred
= 18 − 12.3 = 5.7 $R^2 = 5.7^2 = \boxed{32.49}$

6 Predicted = 0.55(10) + 3.5 = $\boxed{9}$

R = Obs − Pred
= 9 − 9 = 0 $R^2 = 0^2 = \boxed{0}$

c) 7.29 + 32.49 + 2.25 + 0 + 0 + 85.52 = $\boxed{127.59}$

d) Interpolation

e) y = 0.55(30) + 3.5 = $\boxed{\text{20 states}}$

(10) a) y = 0.6(70) + 3 = 45 states − predicted
42 states − observed

R = Obs − Pred
42 − 45 = $\boxed{-3}$

b) y = 0.6(40) + 3 = 27 − predicted
27 − observed

R = Obs − Pred
= 0 − 0 = 0 $(0)^2 = \boxed{0}$

c)

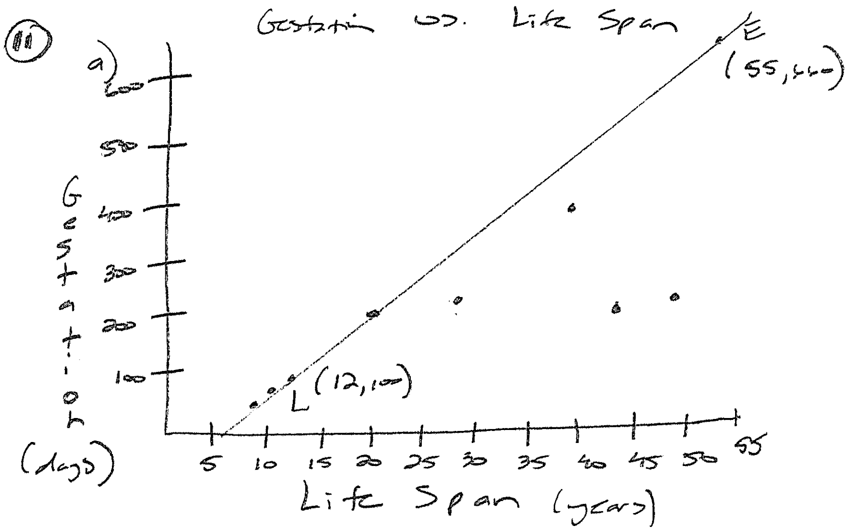
Age	States visited	y = 0.6x + 3 Predicted	R = O − P Residual	R^2
16	15	12.6	15−12.6 = 2.4	5.76
16	18	12.6	18−12.6 = 5.4	29.16
40	27	27	27−27 = 0	0
70	42	45	42−45 = −3	9
10	9	9	9−9 = 0	0
45	19	30	19−30 = −11	121

$\boxed{\text{Sum} = 164.92}$

d) Extrapolation

e) y = 0.6(100) + 3 = $\boxed{63}$

11 a)



b) Line fits data fairly well.

c) Slope $= \frac{660-100}{55-12} = \frac{560}{43}$

$y = 660 + \frac{560}{43}(x - 55)$

$y = 660 + \frac{560}{43}x - \frac{30800}{43}$

$\boxed{y = \frac{560}{43}x - \frac{2420}{43}}$

d) Gestation increases by 13 days as the life span increases by 1 year.

e) Observed = 240

Predicted = $y = \frac{560}{43}(27) - \frac{2420}{43} = 295.35$

$R = 240 - 295.35 = \boxed{-55.35}$

f) $y = \frac{560}{43}(80) - \frac{2420}{43} \rightarrow$ about 986 days extrapolation

g)

Life years	(obs) Gest. days	(Pred) Gest days	R = O - P Residual	R^2
20	215	204.19	10.81	116.86
40	390	464.65	-74.65	5572.62
55	660	660	0	0
50	251	594.88	-343.88	118253.45
9	42	60.93	-18.93	358.34
45	240	529.77	-289.77	83966.55
12	100	100	0	0
27	240	295.35	-55.35	3063.62
10	63	73.95	-10.95	119.90

$y = \frac{560}{43}x - \frac{2420}{43}$

Sum: 211,451.44