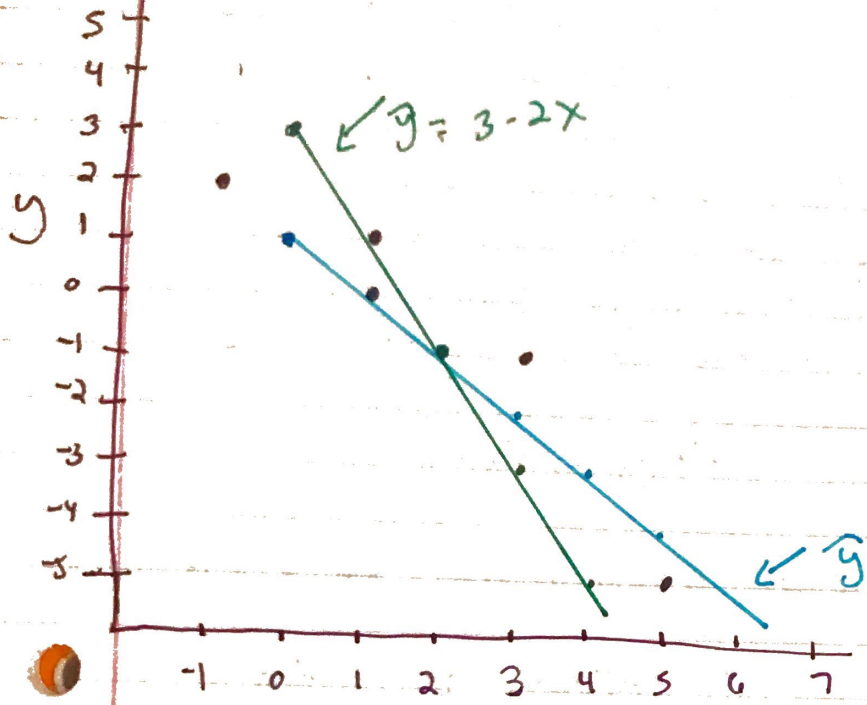
HW 3.2 Part B pg 191-193 problems 43, 45, 47, 53

(43)



The blue line is $\hat{y} = 1 - x$ and the green line is $\hat{y} = 3 - 2x$.

The blue line comes closer to all the data points, so the line $\hat{y} = 1 - x$ fits the data better.

(45) Actual pH for week 50 was 5.08

Predicted pH for week 50: $\hat{pH} = 5.43 - 0.0053(50) = 5.165$

Residual = $5.08 - 5.165 = -0.085$

The predicted pH was .085 larger than the actual pH (or the actual pH was .085 smaller than the predicted pH)

(47) a) x = women's heights $\quad y$ = men's heights

$\bar{x} = 64.5$in $\quad s_x = 2.5$in $\quad \bar{y} = 68.5$in $\quad s_y = 2.7$in $\quad r = 0.5$

$\hat{y} = a + bx \qquad b = r \cdot \frac{s_y}{s_x} = 0.5\left(\frac{2.7}{2.5}\right) = 0.54$

$b = 0.54$

$(\bar{x}, \bar{y}) = (64.5, 68.5)$

$68.5 = a + .54(64.5)$

$68.5 = a + 34.83$

$a = 33.67$ in

$\hat{y} = 33.67 + 0.54x$

→ remember, line of regression always goes through point $(\bar{x}, \bar{y})$, so plug in slope b and $(\bar{x}, \bar{y})$ and solve for a

(47) b) $\hat{y} = 33.67 + 0.54x$

$\hat{y} = 33.67 + .54(67) =$ 69.85 in ← predicted height of husband whose wife is 67 in

Without Calculation

A woman's height of 67 inches is on standard deviation above the mean. (64.5 + 2.5 = 67)

Remember, a change in one standard deviation in x corresponds to a change of r standard deviations in y.

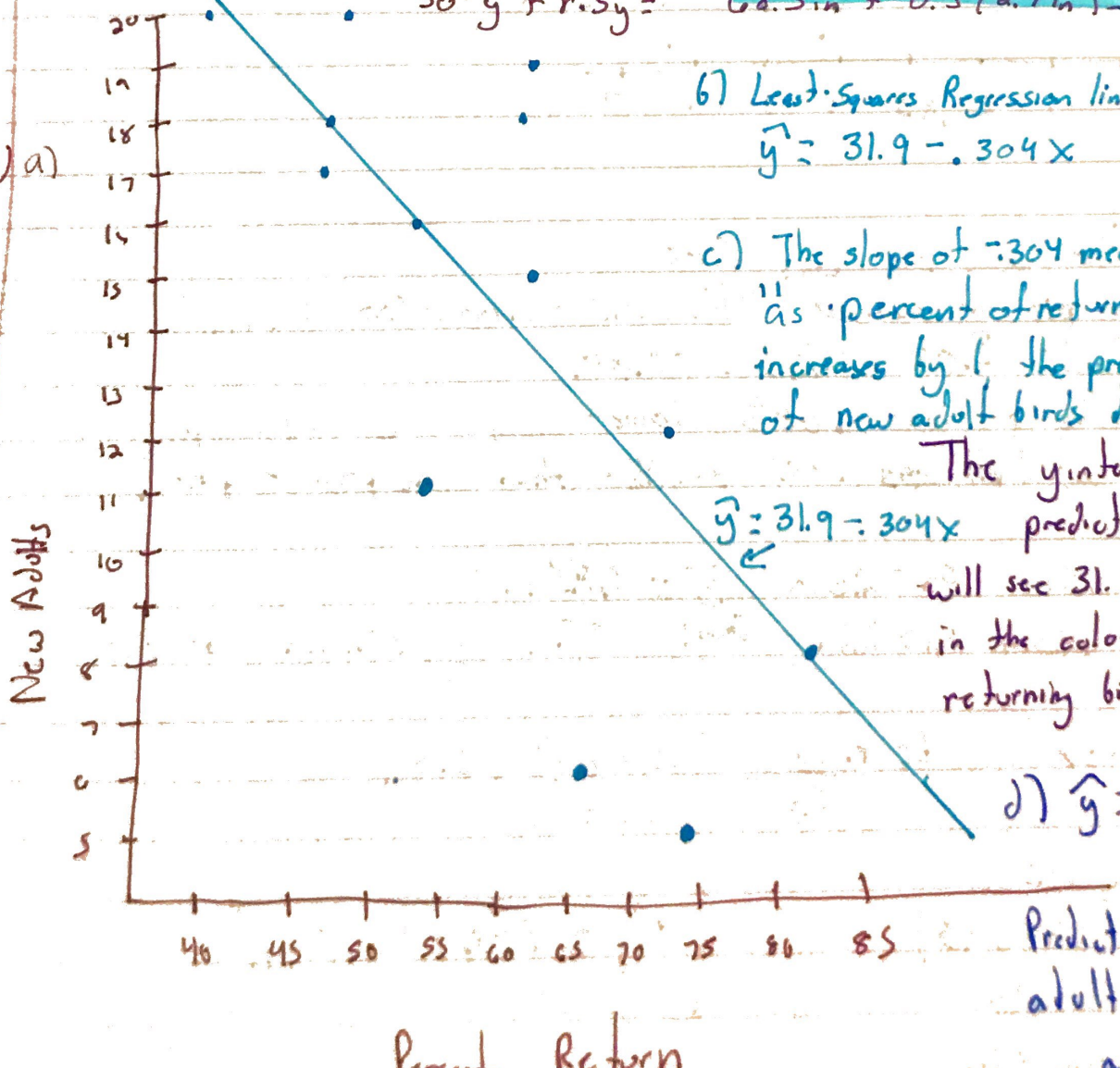
$r \cdot s_y$

$r = 0.5$ $s_y = 2.7$ in

$\bar{y} = 68.5$ in

so $\bar{y} + r \cdot s_y =$ 68.5 in + 0.5(2.7 in) = 69.85 in

(53) a)



b) Least-Squares Regression line

$\hat{y} = 31.9 - .304x$

c) The slope of -.304 means as percent of returning birds increases by 1 the predicted # of new adult birds decrease by 0.304. The y-intercept of 31.9 predicts that we will see 31.9 new adult birds in the colony when % of returning birds is zero.

$\hat{y} = 31.9 - .304(60)$

$= 13.66 \approx 14$

d) Predict # of new adults is 13.66 or about 14.