

①

Husbands

$$\bar{X}_H = 100$$

$$S_H = 15$$

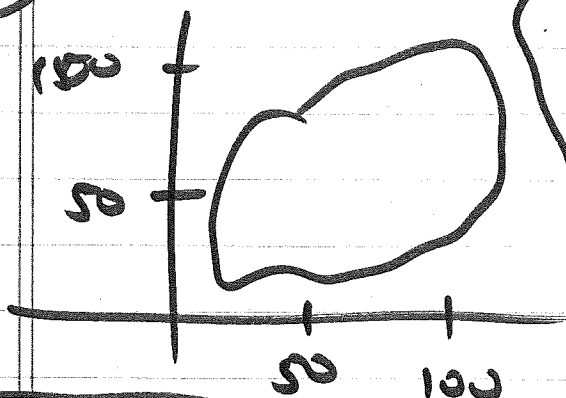
Wives

$$\bar{X}_W = 100$$

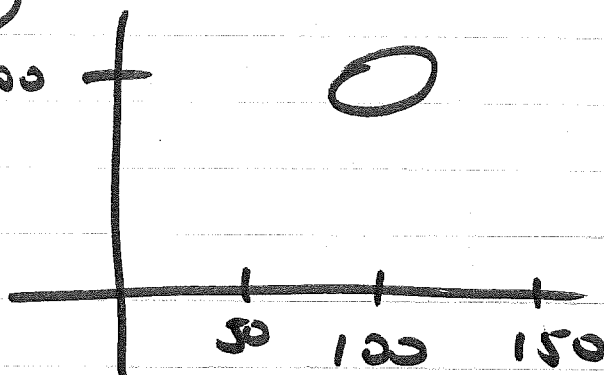
$$S_H = 15$$

$$r = .6$$

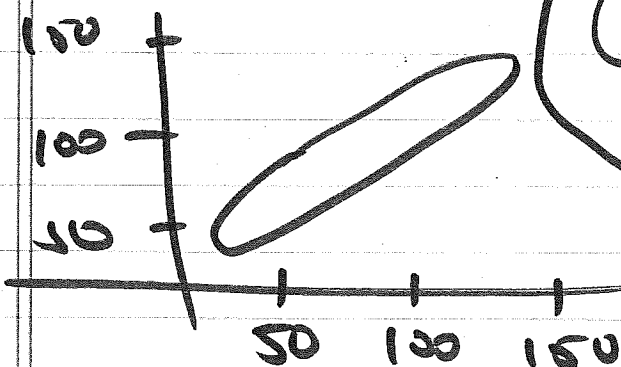
a



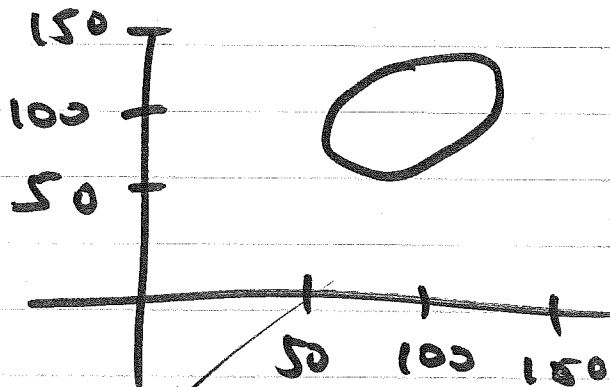
b



c

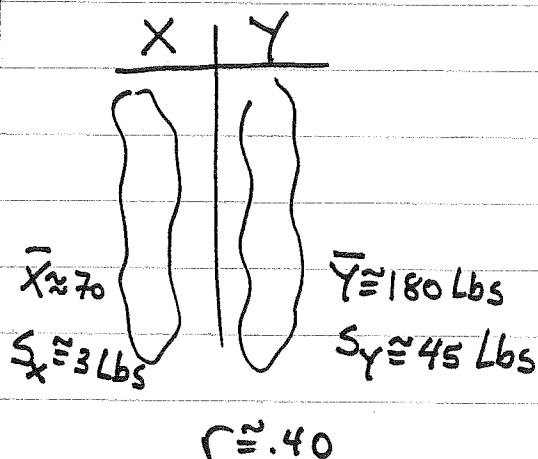


d



correct

Regression → Why? (Regression) Tumor (I)  
 $n=471$  (Example)

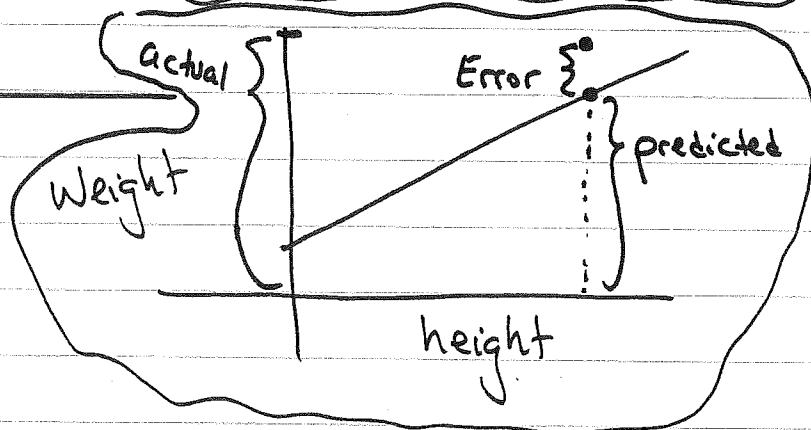
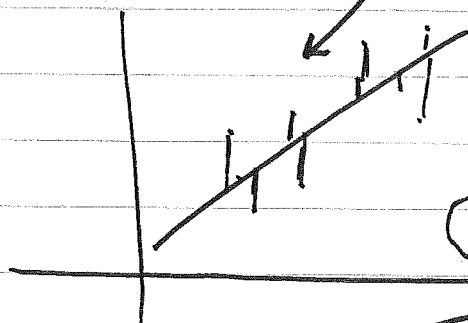


$$\hat{\text{weight}} = a + b \text{ height}$$

$$b = r \frac{S_y}{S_x}$$

$$a = \bar{y} - b\bar{x}$$

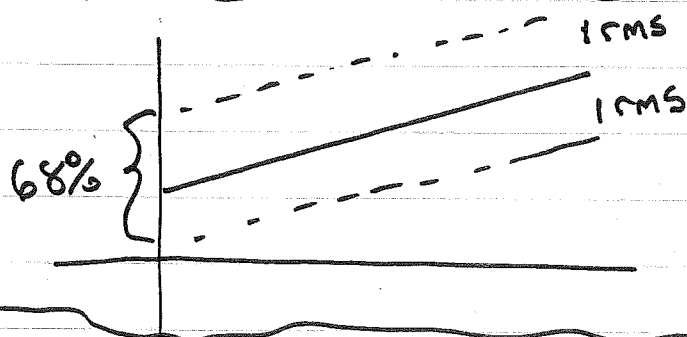
Error = actual - predicted  
 residual = data - model



## Root Mean Square Error (RMSE)

$$RMSE \approx \sqrt{\frac{(\text{error } 1)^2 + (\text{error } 2)^2 + \dots + (\text{error } 471)^2}{471}}$$

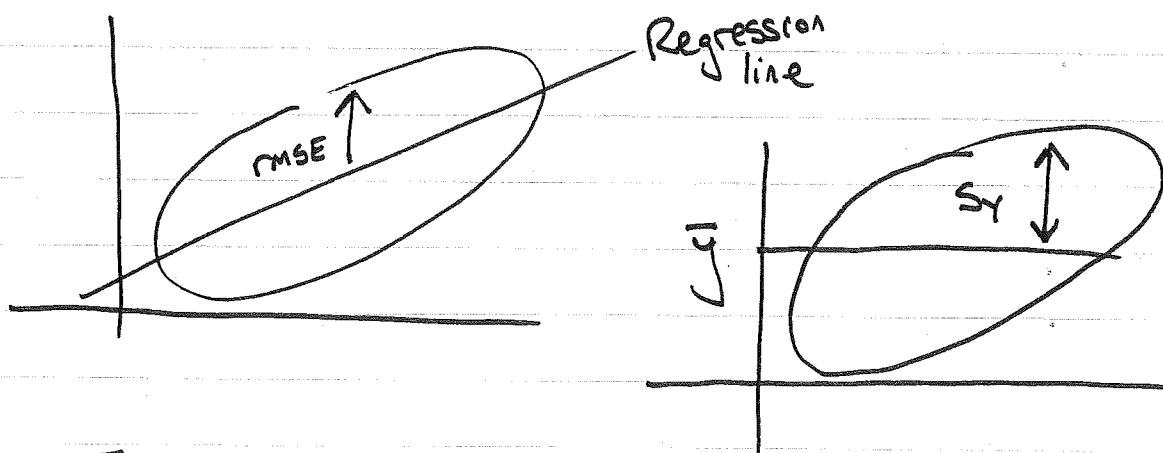
The RMSE for regression says how far typical points are above or below the line.



### Interpret S

About 68% of the time, the predictions will be right to within 1rms points

The RMSE is to the regression line as the  $S_x$  is to  $\bar{x}$  ( $S_y$  is to  $\bar{y}$ )



The RMSE will be smaller than  $S_y$  by a factor of  $\sqrt{1 - r^2}$

$$RMSE \approx \sqrt{1 - r^2} S_y$$

III

Coefficient of  
Determination

$r^2$

