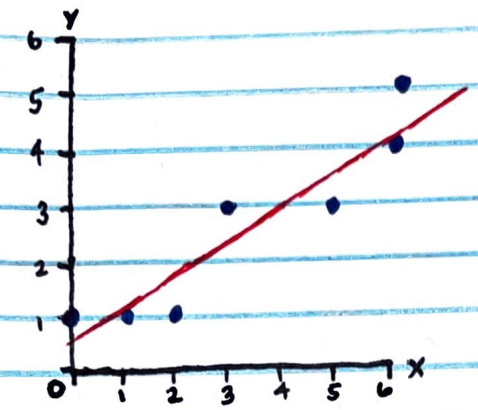
STAT 515 Homework #6 - Mathew Houser

11.25 (b) $\hat{y} = 19.393 - 8.036x$

(c) y-intercept: wicking length with no antibodies
slope: expected change in wicking length for a change in antibody concentration.

11.58 (a)

(c)



(b) $y = 135/248 + 153/248\ x$
$\bar{x} = 23/7 \quad \bar{y} = 18/7$
$SS_{xy} = 153/7$
$SS_{xx} = 248/7$
$SS_{yy} = 110/7$
$SSE = 553/248$
$s = 0.668$

(e) $t_c = \frac{\hat{\beta}_1}{s/\sqrt{SS_{xx}}} = 5.499$ $df = 5$

(d) $H_0: \beta_1 = 0$
$H_a: \beta_1 \neq 0$

(f) Rejection Region: $|t_c| > 2.571$
The calculated test statistic falls within the rejection region, therefore there is sufficient evidence to conclude that x contributes information for the prediction of y at the $\alpha = 0.05$ Significance level.

(g) 95% CI = (0.328, 0.905)

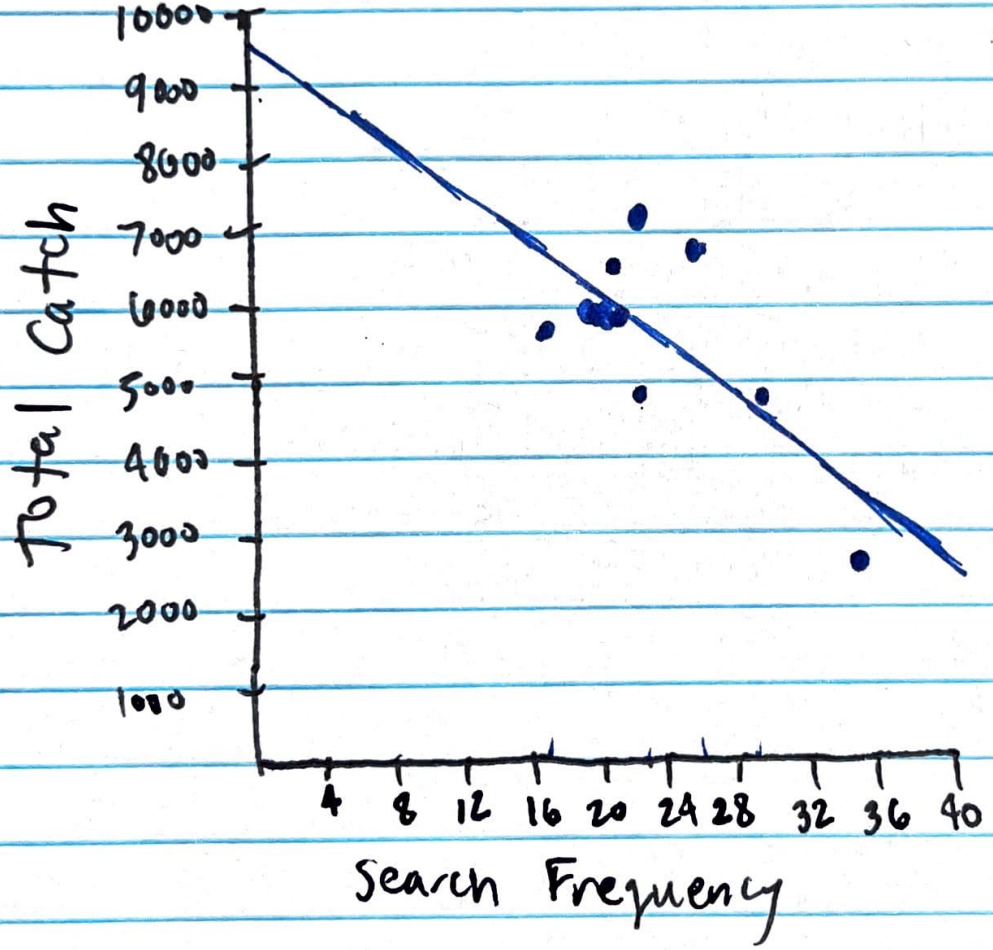
11.63 (b) $\hat{y} = 9658.24359 - 171.57265\ x$
slope: expected change in total catches for a change in search Frequency.

(c) $H_0: \beta_1 = 0 \quad H_a: \beta_1 < 0$

(d) p-value = 0.0402

(e) $\alpha = 0.05 > 0.0402 = $ p-value. Therefore there is sufficient evidence to conclude that the total catch is negatively Linearly related to search frequency.

11.63 (a)



Negatively Linear trend in the data

11.90 (a) $r = 0.84$; thus the magnitude of a quasi-stellar object is positively linearly correlated to its red shift level.

(c) $r^2 = 0.706$; thus 70.6% of the variation in magnitude can be explained by the red shift level.

13.6 $E_1 = 80$; $E_2 = 80$; $E_3 = 160$; $df = 2$; $\alpha = 0.05$

$\chi_c^2 = 8.075$

Rejection Region: $\chi_c^2 > 5.99$

The calculated test statistic falls within the rejection region, therefore at the $\alpha = 0.05$ Significance level, there is sufficient evidence to reject the null hypothesis.