$SST = \sum(y-\bar{y})^2$ $R^2 = 1 - \frac{SSE}{SST} = \frac{SSR}{SST}$

$SSE = \sum(y-\hat{y})^2$ $Adj\ R^2 = 1 - (SSE/(n-p-1))/(SST/(n-1))$

$SSR = \sum(\bar{y}-\hat{y})^2$

f statistic $= (SSR/p)/(SSE/n-p-1) = (R^2/p)/(1-R^2)/(n-p-1)$

n = number of obs   p = number of variables

comparing two models $F = \frac{(R_2^2 - R_1^2)/(P_2 - P_1)}{(1-R_2^2)(n-P_2-1)}$

Linear - Linear Model
Price = $b_0 + b_1$ * lotsize
As lot size ↑, y changes by b_1 units

Linear - Log model.
$y = b_0 + b_1 * \log_e(X)$
for 1% ↑ in X ; y changes by $b_1/100$

Log Linear Model
$\log(Price) = b_0 + b_1$ lotsize
for 1 unit ↑ X, log(y) changes by $b_1 \times 100$

Log Log Model
$\log(y) = b_0 + b_1 * \log(X)$
for 1% ↑ in X, y changes by $\frac{b_1}{100}$

2:1 odds means the event is twice likely to happen

Odds for = $\frac{\text{Probability that event will happen}}{\text{Probability that event will not happen}} = \frac{P}{(1-P)}$

$P = \frac{\text{Odds for}}{1 + \text{Odds for}}$

Logistic function $P(x) = \frac{e^{b_0 + b_1 x}}{1 + e^{b_0 + b_1 x}} = \exp(b_0 + b_1 x)) / [1 + \exp(b_0 + b_1 x)]$

$1 - P(x) = 1/[1 + \exp(b_0 + b_1 x)]$

$Logit(P) = \log(P/(1-P)) = b_0 + b_1 x$

Confusion Matrix

True value	Predicted Value 0	Predicted Value 1
0	TN	FP
1	FN	TP

Sensitivity = $\frac{TP}{TP + FN}$

Specificity = $\frac{TN}{TN + FP}$ Precision = $P(y=1 | \hat{y}=1) = \frac{TP}{TP + FP}$

False Positive Rate = $\frac{FP}{TN + FP}$ Accuracy = $\frac{TP + TN}{TP + FP + TN + FN}$

TYPE 1 Error = FP (Increasing cutoff decreases Type I Error)

TYPE 2 Error = FN (Decreasing cutoff decreases Type II Error)