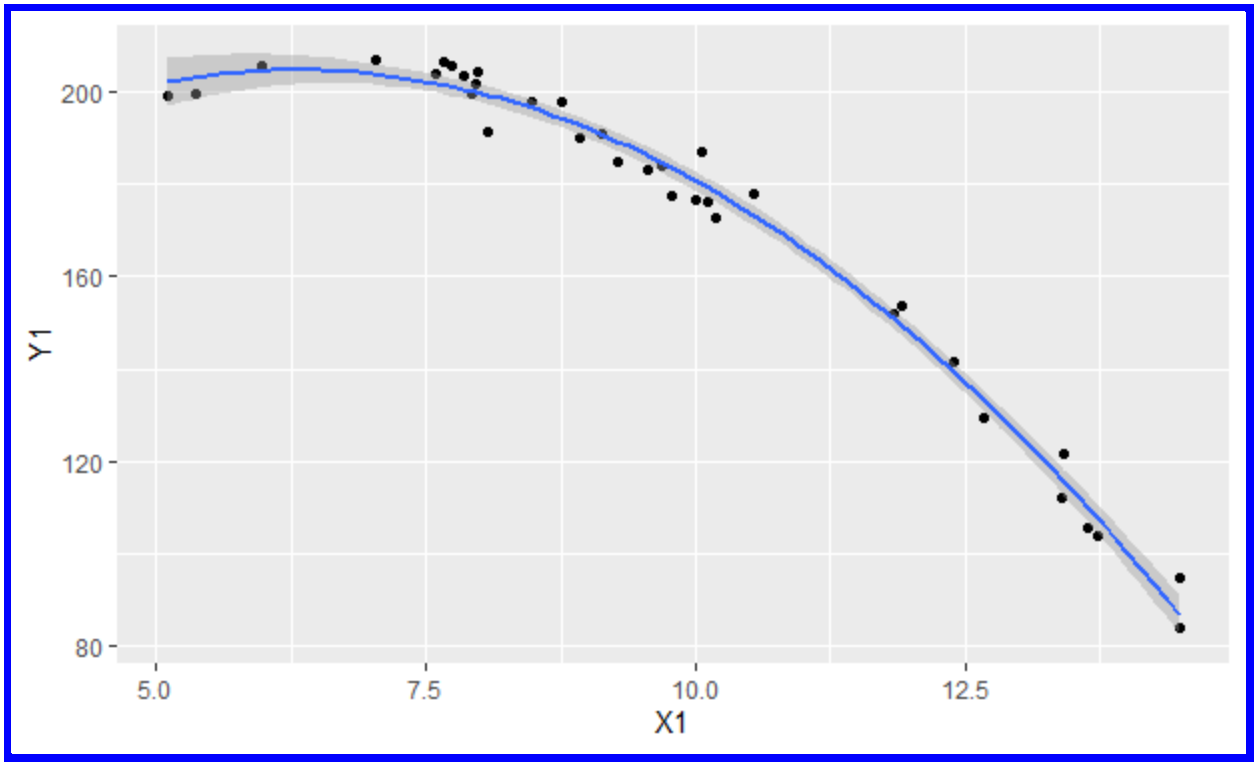
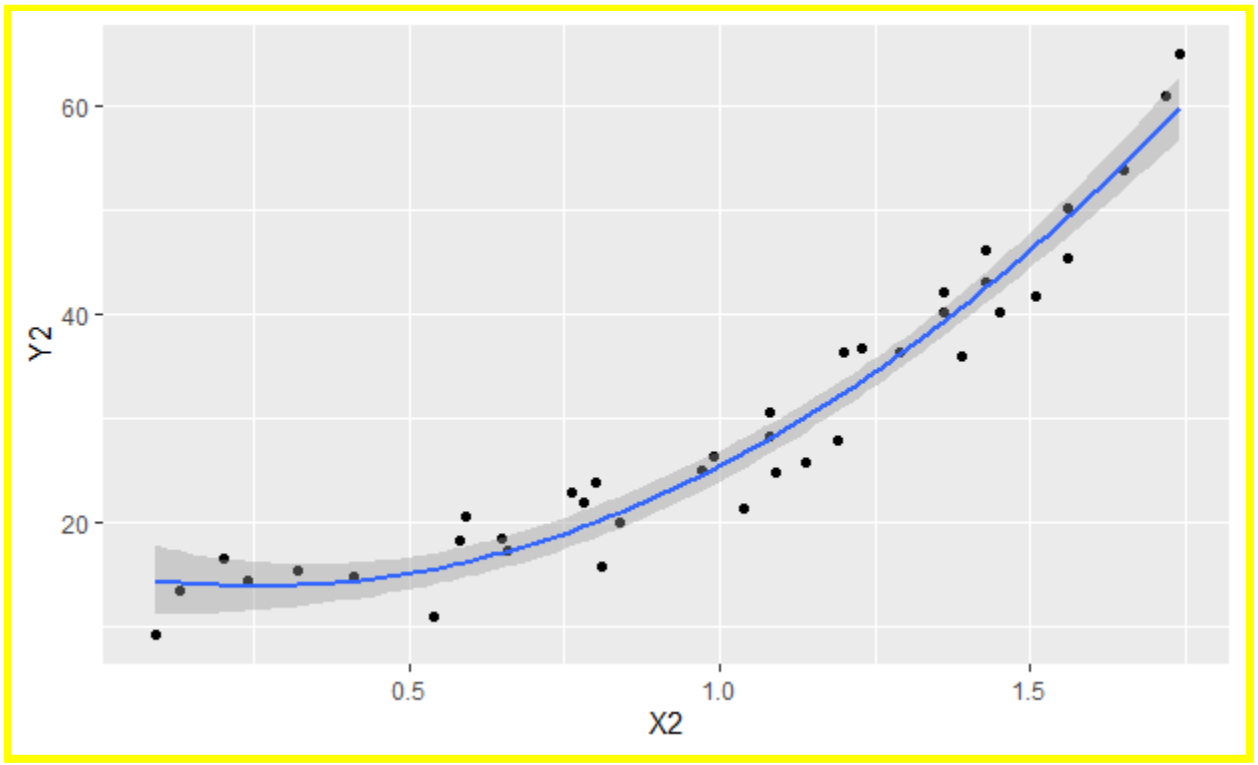
#1 - Scatterplots





#2 - Which model?

X1 and X2 exhibit a quadratic relationship while X2 and Y2 appear to have an exponential relationship.

#3 - Analysis

For variables X1 and Y1, there is a significant quadratic relationship.

For variables X2 and Y2, there is a significant exponential relationship between variables.

```
Call:
lm(formula = nonlinear$Y1 ~ nonlinear$Y2 + X1sq)

Residuals:
    Min      1Q  Median      3Q
-24.528  -3.822   3.211   5.535
    Max
 12.179

Coefficients:
             Estimate Std. Error
(Intercept)  238.2145     4.6895
nonlinear$Y2   0.1284     0.1061
X1sq          -0.6850     0.0288
             t value Pr(>|t|)
(Intercept)    50.80   <2e-16 ***
nonlinear$Y2    1.21    0.235
X1sq          -23.79   <2e-16 ***
---
Signif. codes:
  0 '***' 0.001 '**' 0.01 '*' 0.05
  '.' 0.1 ' ' 1

Residual standard error: 8.799 on 32 degrees of freedom
  (4 observations deleted due to missingness)
Multiple R-squared:  0.9468,    Adjusted R-squared:  0.9434
F-statistic: 284.5 on 2 and 32 DF,  p-value: < 2.2e-16
```

```
Call:
lm(formula = log(nonlinear$Y2) ~ nonlinear$X2)

Residuals:
     Min       1Q   Median       3Q
-0.43355 -0.07484  0.02495  0.09559
     Max
 0.31863

Coefficients:
             Estimate Std. Error
(Intercept)   2.29060    0.05693
nonlinear$X2  0.99481    0.05189
             t value Pr(>|t|)
(Intercept)    40.23   <2e-16 ***
nonlinear$X2   19.17   <2e-16 ***
---
Signif. codes:
  0 '***' 0.001 '**' 0.01 '*' 0.05
  '.' 0.1 ' ' 1

Residual standard error: 0.1489 on 37 degrees of freedom
Multiple R-squared:  0.9085,    Adjusted R-squared:  0.9061
F-statistic: 367.6 on 1 and 37 DF,  p-value: < 2.2e-16
```