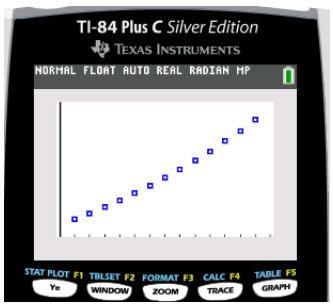
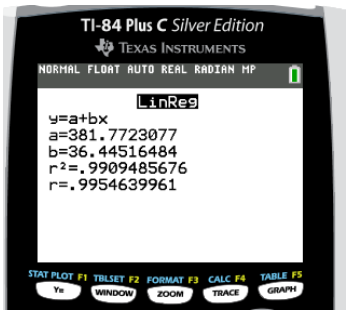
Answers In Class Assignment & HW Section 4.1

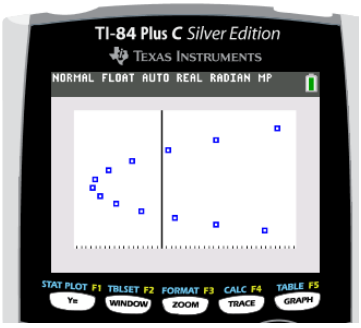
I. Create scatterplot, regression statistics, and residual plots

**Place freq in L1, position in L2, ln(freq)in L3, Ln(position) in L4

1. Results for freq vs position

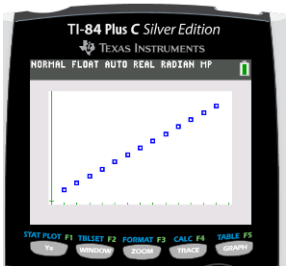


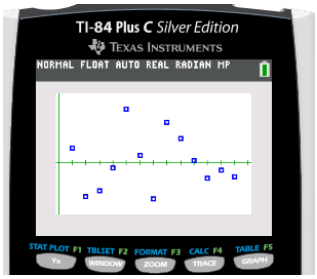




Nonlinear trend High r and r^2 Pattern in residual plot

2. Results for ln (freq) vs position





Linear trend ***Higher*** r and r^2 No pattern in residual plot

Exponential Regression Model of ln (freq) vs position

pred ln (freq) = 6.03 + 0.0578(position)

pred (freq) = $e^{(6.03 + 0.0578(\text{position}))}$

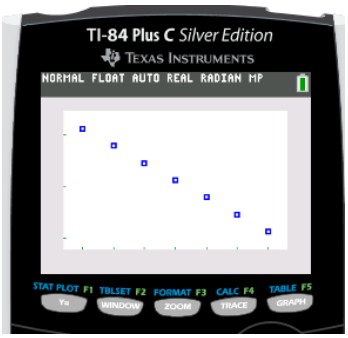
II. Predict the frequency of the C note that is one octave higher (position 16) than the C note with frequency 52.025 Hz.

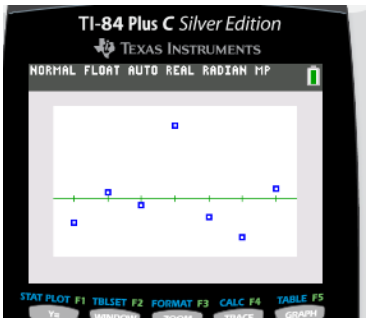
Prediction:

pred (freq) = $\boldsymbol{e}^{(16)} \approx 1048.17$ Hz

Results for p. 276 #5

Exp Regression: ln (light intensity) vs depth



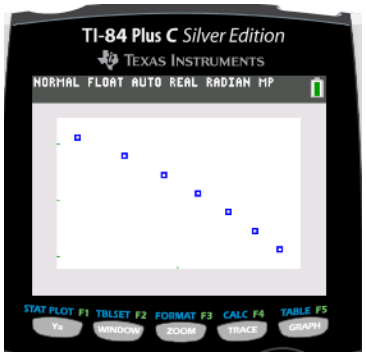


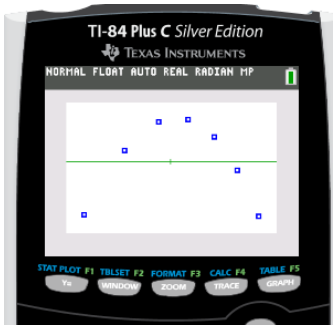
Use TRACE to see size of residuals. They are VERY SMALL!

pred ln (light intensity) = 6.79 - 0.333(depth)

pred (light intensity) = $e^{(6.79 - 0.333(\text{depth}))}$

Power Regression: ln (light intensity) vs ln (depth)





pred ln (light intensity) = 9.30 - 2.53 ln(depth)

pred (light intensity) = $e^{(9.30 - 2.53\ln(\text{depth}))}$

Prediction: Make statements **comparing scatterplots**, **correlation coefficients, coefficient of determinations, and residual plots** of

ln (light intensity) vs depth and ln (light intensity) vs ln (depth)

Exponential model is the better of the two choices.

$$\text{pred (freq)} = e^{(6.79 - 0.333(\text{depth}))}$$

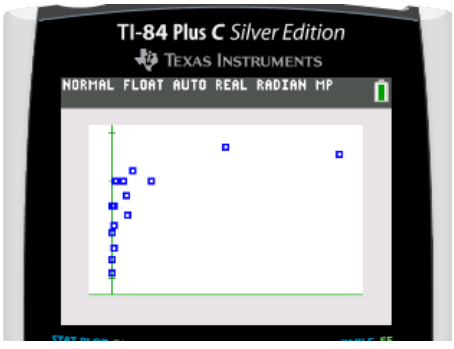
$$\text{pred (freq)} = e^{(6.79 - 0.333(\mathbf{22}))}$$

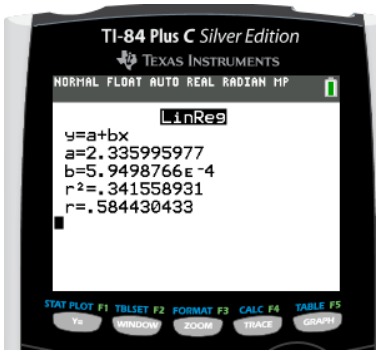
$$\text{pred (freq)} = e^{-0.536} = \mathbf{0.5851 \text{ lumens}}$$

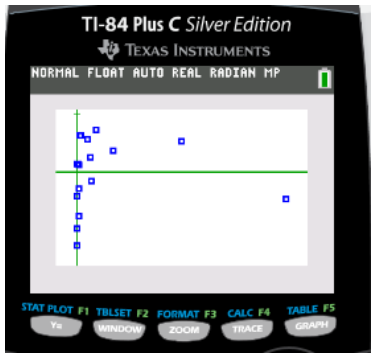
Not surprising; the residual at 22 m is very small; this would be expected since, based on our statistical output, our model provided an excellent fit.

Results for p. 285 #11

Exponential Regression: ln (life span) vs (weight)



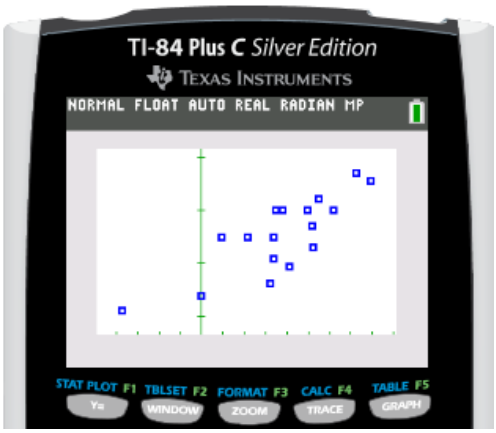


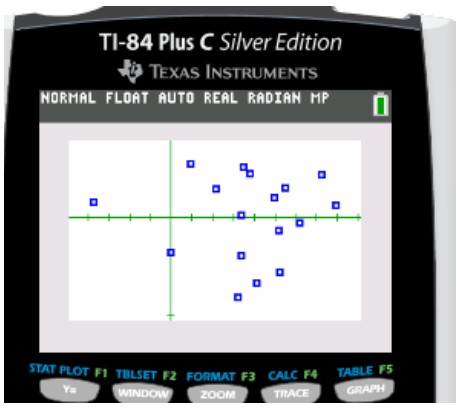


pred ln (life span) = 2.38 + 0.00006(weight)

$$\text{pred (life span)} = e^{(2.38 + 0.00006(\text{weight}))}$$

Power Regression: ln (life span) vs ln (weight)





pred ln (lifespan) = 1.74 + 0.213 ln (weight)

pred (lifespan) = $e^{(1.74 + 0.213 \ln (\text{weight}))}$

Prediction: Make statements **comparing scatterplots, correlation coefficients, coefficient of determinations, and residual plots** of

ln (life span) vs weight and ln (life span) vs ln (weight)

Power model is the better of the two choices.

pred (lifespan) = $e^{(1.74 + 0.213 \ln (\text{weight}))}$

pred (lifespan) = $e^{(1.74 + 0.213 \ln (65))}$

pred (lifespan) = $e^{2.629}$ = **13.86 yr**