**Math 1200 -College Algebra for Business names**

**Introduction to Excel VI: Power Function Modeling**

0. Housekeeping – Put the names of all the group members on the first sheet of an Excel workbook. Save the file with the name ExcelVIName.xlsx where is yourname.

1. Creating power function models in Excel:

We have worked enough with building models for us to look at building models with real world data this time. We are going to start by building an exponential model for the length of planetary orbits. Download the Power Function Models file from blackboard. This contains data that you would otherwise have to type.

A) Select the Planets data, which has the average distance from the sun and the length of the planet’s year in months.

1. Insert a scatterplot and add a trendline, with the formula showing. The trendline should be a power model.
2. Add a column to your data with the predicted length of the year in months.
3. Scientists have speculated that the asteroids are a missing planet between Mars and Jupiter. Predict the length of the year for a planet at distance 250 million miles from the sun.
4. There is speculation about a planet X in the ort cloud at a distance of 10,000 million miles from the sun. Predict the length of its year.

B) Select the height-weight data which gives the ideal weight for a male of a given height and frame type.

1. Insert a scatterplot and add trendlines for each frame type, with the formulas showing. The trendlines should be power models.
2. Add columns to your data with the predicted weight for given heights.
3. Predict the ideal weights for a man of height 5 feet and 6 feet 6 inches for each frame type.

C) Select the cans date which gives surface area and volume of a can as a function of its size.

1. Insert a scatterplot of size vs unit cost and add a trendline relating these two quantities. The trendline should be power model.
2. Add columns to your data with the predicted unit cost for given size.
3. Predict the size that has a unit cost of 0.05.

2. Using logs to compare models and Desmos:

When we started trendlines we gave a definition for best fitting line. We have used Excel as a black box to fit models that are exponential and logarithmic functions. It is worthwhile to point out how Excel does that, since another technology may use a different method.

If we have an exponential model,

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then by taking logs we can convert to a linear model,

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In the converted model ln(y) is linear in x.

Similarly, if we have a power model

then by taking logs we can convert to a linear model,

In the converted model ln(y) is linear in ln(x).

In both cases, Excel converts to logs, finds the best fit line, and converts back,

Desmos gives you the option of fitting the log model and fitting the regular model.

The answers are slightly different and we want to do things the way Excel does them.

A) Pick your favorite case study above. You already have a scatter plot for x and y.

Add columns for ln(x) and ln(y). Do a scatter plot for these columns and add a best fitting trendline. Comment on the comparison of the coefficients of the power model of the original data and the coefficients of the linear model of the log data.