

PowerPoint Notes on Data Analysis

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Bill: independent = time, dependent = weight

Bethany: independent = position on court, dependent = # shots made

Gustavo: could be interpreted in different ways, but probably independent = hours watching tv, dependent = pages read

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After teaching these relationships, you may want students to complete the “Data Analysis Activity #1” to practice identifying these trends and making graphs.

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This graph was originally created to demonstrate the effect of noise, so the black line represents the “true” line from which the data were generated.

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This slide should be considered an optional extension into the actual mechanism of deriving a slope (and associated uncertainty) for a straight line. Most students will be familiar with simply having Excel fit a linear model, but it may be more meaningful in some cases for students to derive the values themselves.

The equation for s is essentially the rms of the residuals, divided by the number of degrees of freedom, which is equal to $(n-2)$, since two parameters (m , b) have already been fit.

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For the first graph, 164 represents the speed of the object. The units of that constant are m/s.

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The question is meant to be rhetorical. While it may be plausible to consider constants with units of m/s or even m/s^2 , the first term's m/s^5 is hard to imagine a physical representation for.

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Encourage students to consider the dramatic growth of distance that would occur at increasing times with this trendline. Thus, the exponential trendline is unlikely to reflect the situation at work in these data.

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There are three superimposed graphs from Excel on the bottom left of this slide. The idea would be to animate this in such a way that students first see the data without a trendline, then see it with a linear trend, then see the data as a line graph with the variations emphasized. Finally, display the graph with error bars and ask students if there is a significant seasonal variation trend.

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