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AP STATISTICS – MS. KLIMCZUK

Calculator Activity: Using Logarithmic Re-Expressions

The data below shows the relationship between the f/stop of a camera’s lens and its shutter speed.

|  |  |
| --- | --- |
| **Shutter Speed** | **f/Stop** |
| 1/1000 | 2.8 |
| 1/500 | 4 |
| 1/250 | 5.6 |
| 1/125 | 8 |
| 1/60 | 11 |
| 1/30 | 16 |
| 1/15 | 22 |
| 1/8 | 32 |

Enter this data into your calculator and make a scatterplot. What do you notice? Would you use a linear model to represent this data?

Now let’s find the logarithm of each variable’s values. Keep track of where you store everything so that you don’t get confused.

Go to the home screen and put ***log(speed) 🡪 L3*** and put ***log(f/stop) 🡪 L4***.

Make three scatterplots.

1. f/stop vs. log(speed) using ***Xlist:L3*** and ***Ylist:L2***
2. log(f/stop) vs. speed using ***Xlist:L1*** and ***Ylist:L4***
3. log(f/stop) vs. log(speed) using ***Xlist:L3*** and ***Ylist:L4***

Make sure to check the residuals plots. When you do this, you need to remember to first calculate the regression. Now pick your favorite scatterplot. Which one do you think would be the best scatterplot to put a linear model to? Explain why.

Use your regression to write the equation of the model you chose. Remember to write your model with logarithms. Your calculator will not do this for you.

Now estimate the f/stop for a shutter speed of 1/45.