Linear and Nonlinear Relationships

Pencil and Sharpener

By: Faris Livingstone and N8 Bogdan

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pencil
/ˈpensəl/
noun

1. An instrument for writing or drawing, consisting of a thin stick of graphite or a similar substance enclosed in a long thin piece of wood or fixed in a metal or plastic case.

Pencils are one of the most important instruments in education. People are now starting to use more mechanical pencils than wooden. This is because wooden pencils are wasted and getting used up too quickly because of sharpening. So we conducted a test to see the relationship between the length of pencils before and after sharpening them for different times.

What We Are Going To Do:

- We are experimenting if different pieces of data are linear or not
- Sharpening pencils for different amounts of time and looking at the lengths of each pencil to see a linear relationship

Data:

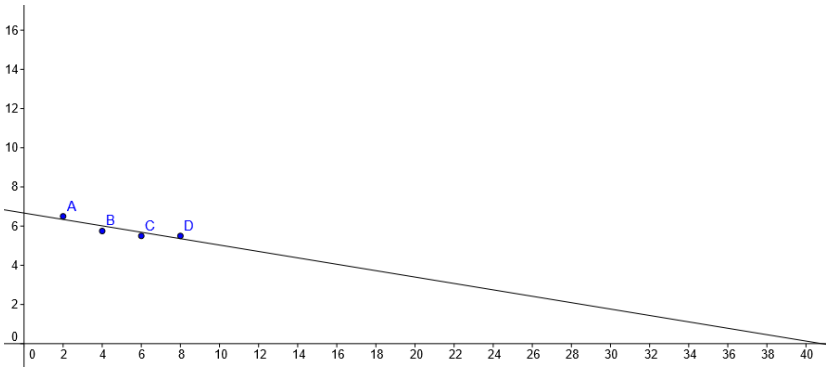
Length of the Pencil Before Sharpened	# of Seconds Sharpened	Length of the Pencil After Sharpened
#1) 6.5 in	#1) 2 sec	#1) 6 in
#2) 6.5 in	#2) 4 sec	#2) 5.75 in
#3) 6.5 in	#3) 6 sec	#3) 5.5 in
#4) 6.5 in	#4) 8 sec	#4) 5.5 in
#5) 6.5 in	#5) 10 sec	#5) 5.5 in

The Process:

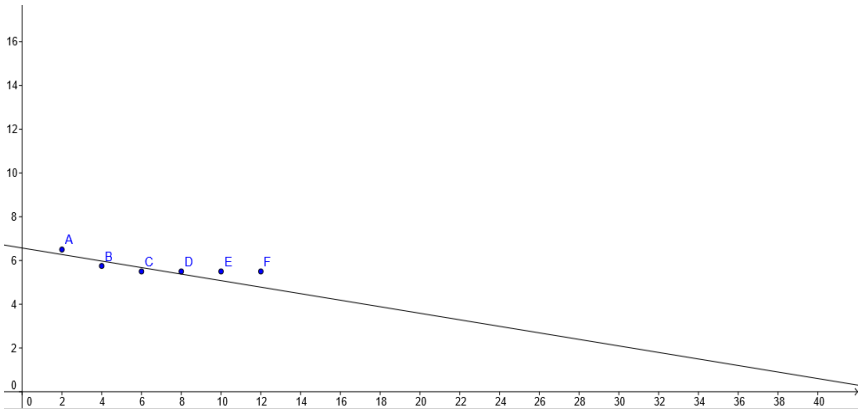
In order to complete our test we had to stay organized and on task. We labeled the pencils from 1-6 and conducted our experiment. The first pencil was sharpened for two seconds, the second pencil was sharpened for three seconds. The time increased by 2 seconds after every pencil.

What We Learned:

During our experiment we soon realized that after 6 seconds the pencil won't become more smaller. Six seconds is the minimum time it takes to fully sharpen a pencil. After the six seconds are up the pencil will not get any shorter no matter how much longer you keep the pencil in the sharpener. We had thought that this relationship would be linear based on the first three pieces of data, but we weren't convinced. With further investigation we had proved ourselves wrong.



This is the first graph we created before we convinced ourselves. With a line of best fit through the points you can see that this group of points is approximately linear... or is it?
After adding more points to the graph we can now see that it is clearly non-linear.



iPhone Sales Throughout the Years

By: Faris Livingstone and N8 Bogdan

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i·Phone
/ifōn/
noun

1. The iPhone is a line of smartphones designed and marketed by Apple Inc. It runs Apple's iOS mobile operating system. The first generation iPhone was released on June 29, 2007.

The iPhone is currently one of the top phones in the market, beating everyone out there with their new innovative technology. Their sleek designs and easy to use technology makes them very attractive to the human eye.

What We Are Going To Do:

- Research if the popularity and sales of iPhones are linear throughout three years.
- Look at data from Apple in 2011, 2012, and 2013 to find information about sales.

Data:

Year	Amount of iPhone Sales
2011	16,239,999
2012	37,040,000
2013	47,800,000

What We Learned:

The amount of iPhones sold through the first quarter of every year had a positive increase. The reason for this was because a new and improved iphone was released almost every year. With the graph below you can see that the iPhone sales through the years is increasing at an approximately constant rate.

Graph Coming Soon....

From this graph you can see that this relationship is approximately linear for the three years. Wait there's a catch. No one knows exactly how many iPhones Apple will sell in the coming years. So if Apple's next idea is a flop. The graph will not show a linear relationship because there will be less sales next year.