Best-Fit Line and Regression Line

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≔ WHAT'S COVERED

This tutorial is going to cover what the best-fit line is used for. Our discussion breaks down as follows:

1. Best-Fit Line/Regression Line

2. Features of a Best-Fit Line

3. Uses for a Best-Fit Line

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1. Best-Fit Line/Regression Line

Imagine a line going through a pack of points. That line is going to be called a **best-fit line**, or a **trend line**, or a **regression line**. The idea of a line of best fit is that it will roughly approximate what's going on with the data in the form of a single line.

⇄ EXAMPLE Suppose we have the following scatterplot.
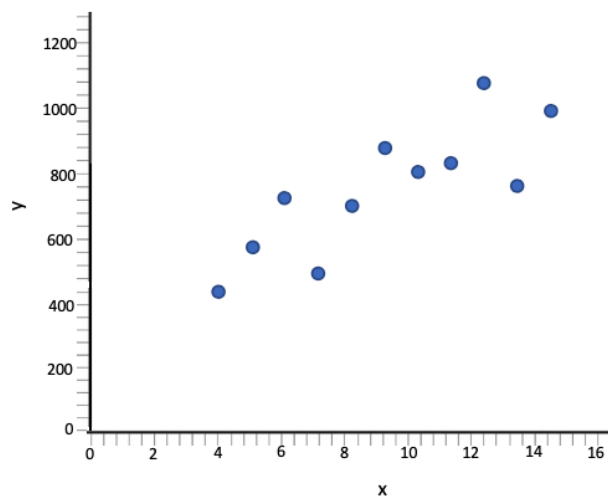
One easy way visually draw a best-fit line is to first place an oval over the top of your points.
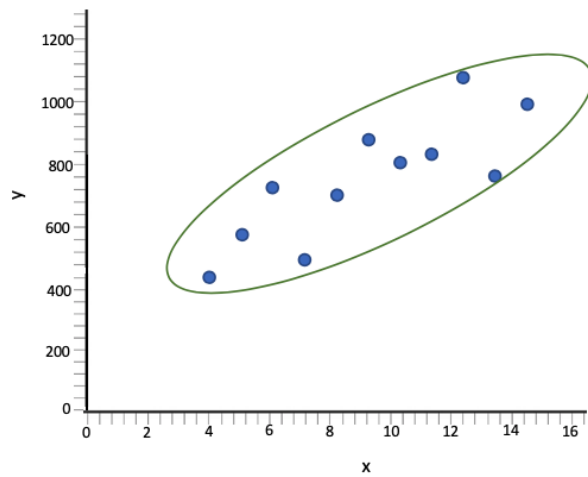
The oval can be symmetric along what we call the minor axis, which is essentially cutting it the hamburger way, or you can cut it along the longer, major axis, which is typically called the hot dog way. You're going to cut it the longer way, which is a fairly good approximation at a line of best fit.
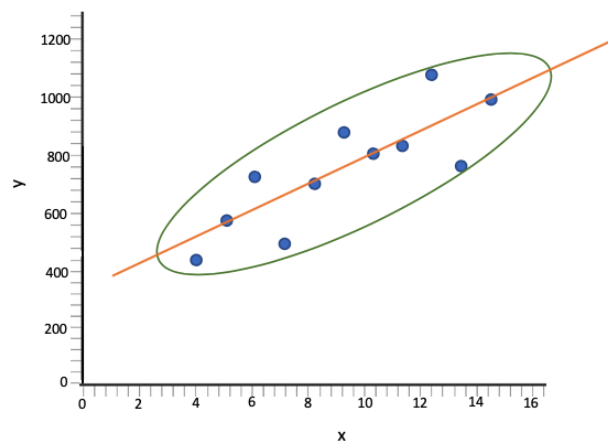
Roughly half the points fall above and below the line. In this particular example, about five of them are fairly near the line, three are substantially below, and three are substantially above.

⭐ BIG IDEA

The term "best-fit line" can be used interchangeably with terms "trend line" and "regression line".

📄 TERM TO KNOW

Best-Fit Line/Trend Line/Regression Line
A line that closely approximates the response values for given explanatory values when the form of the scatterplot is linear.

2. Features of a Best-Fit Line

A good best-fit line will have the following features:

- Roughly half the points above and below the line

- No pattern to how the points are "off" from the line

↪ EXAMPLE This is a poor choice of a trend line. It does not cut the "oval" the long way, and there is a pattern to how the points are above or below the line. With this trend line, any point below the line is off to the right, and any point above the line is off to the left.
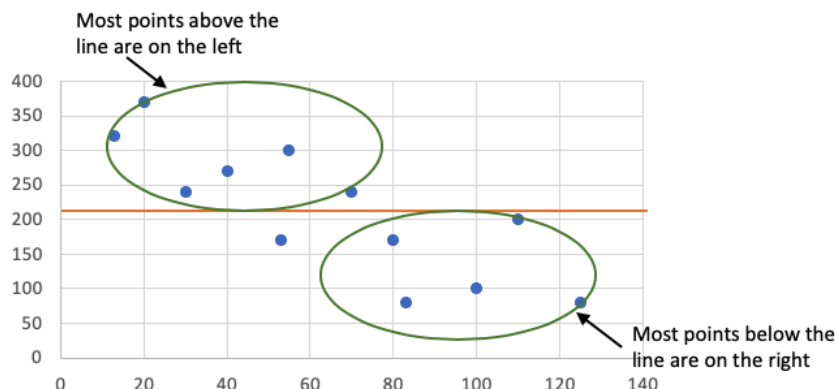

↪ EXAMPLE Below is a better trend line, because the points that are above and below are peppered throughout. You don't want a pattern to how the points are off from the line.
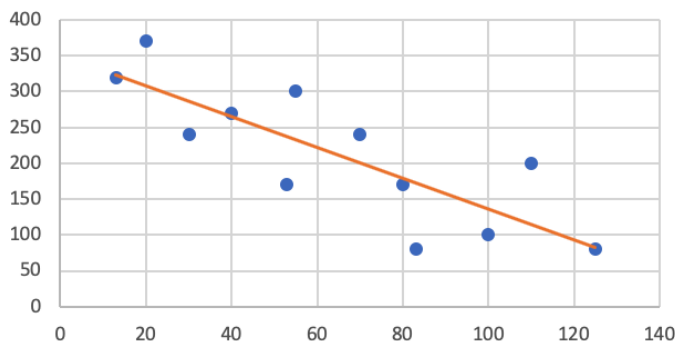
3. Uses for a Best-Fit Line

What is a trend line used for? A line of best fit is used to give approximations for values of x and values of y-- even on places where there is an existing value of y.

↪ EXAMPLE In the scatterplot below, when x equals 6, there's a difference between the actual value of y at 6, and what the line predicts as the value of y at 6.
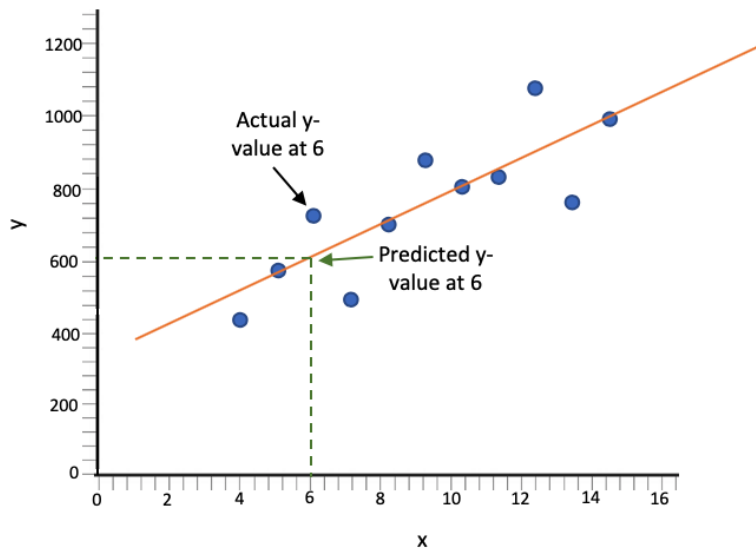
You can use this line to predict other values. What does this best-fit line predict for y if x was 14?

Go over to 14 and then up until you get to the best-fit line. Then go over to y-axis to figure out how high it is at that point. It's at about 960. You can say that the prediction for x being 14 is y being 960.
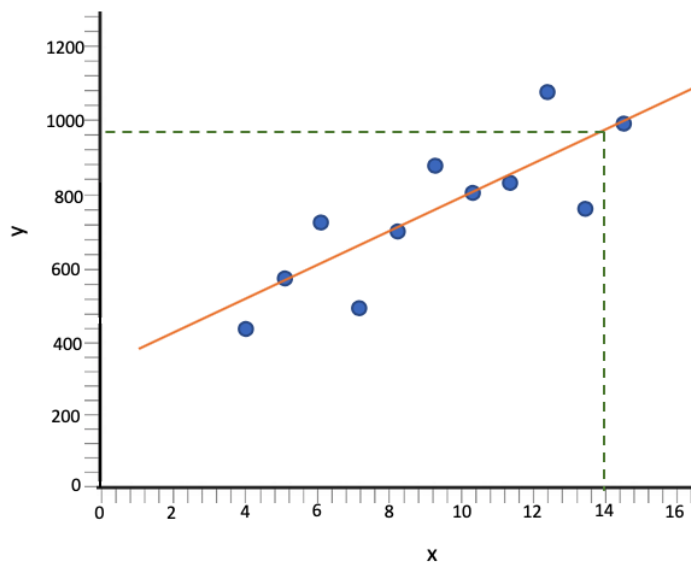
SUMMARY

A line of best fit can understand the general trend of what's is occurring in a scatterplot--how the y values relate to the x values. A good trend line will cut down the middle and have a peppering of points above and below it. It will be a random scatter, as opposed to some systematic flaw in it.

Good luck!

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> 📄 **TERMS TO KNOW**
>
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> A line that closely approximates the response values for given explanatory values when the form of the scatterplot is linear.