About Examining Graphs
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About Examining Graphs

What is a GRAPH?

• A graph is a visual representation of the data. It uses lines, dots, bars, pictures or “pie slices” to describe and illustrate data for the variables of interest.

• Graphs allow us to organize data in a way that makes it easier to interpret, by providing a visual representation of the numbers.

Background

• Take a look at the following Production Possibility Frontier (PPF):

The y-intercept is the value on the y-axis when the x-axis is equal to zero. In the graph above, the y-intercept is (0, 9). This means that when 9 socks are being produced there are not enough resources to produce any sandals.

The x-intercept is the value on the x-axis when the y-axis is equal to zero. In the graph above, the x-intercept is (12, 0). This means that when 12 sandals are being produced there are not enough resources to produce any socks.

Slope

• The slope is the change in the y-axis over the change in the x-axis. For a PPF graph, this tells us the rate at which we can switch from producing one type of good to another.
The Math

- You may remember that an equation for a line is often written in the form \( y = mx + b \). In the figure below, \( y \) represents the Real Price Index, while \( x \) represents Sales. Additionally, \( m \) represents the slope of the line, and \( b \) represents the line’s \( y \)-intercept.

Note: the slope of the line (\( m \)) is negative.

- Given the previous information, we have \( y = (-m)x + b \).

Interchanging the \( x \) and \( y \) axes leads to the following:

\[
\begin{align*}
y &= (-m)x + b \\
y - b &= (-m)x + b - b \\
(y - b) &= (-m)x \\
(y - b)/(-m) &= x \\
x &= (y - b)/(-m)
\end{align*}
\]

So, given the interchanging of axes, the slope of the line remains negative; however, \( -m \) becomes \( 1/-m \).

- Now, let us consider an interchanging of axes on a line of positive slope.

\[
\begin{align*}
y &= mx + b \\
y - b &= mx + b - b \\
(y - b) &= mx \\
(y - b)/m &= x \\
x &= (y - b)/m
\end{align*}
\]

So, given the interchanging of axes, the slope of the line remains positive; however, \( m \) becomes \( 1/m \).
Glossary

Production Possibility Frontier (PPF): is a graph representing the effect of producing one item on the ability to produce another, related item.

Scatter Plot: is a graph representing the distribution of two variables in relation to one another.

Slope: is a measure of the steepness of a line, calculated through the use of two points on that line.

x-axis: the horizontal number line that runs left to right on the Cartesian Plane.

x-Intercept: the value on the x-axis when the y-axis is equal to zero.

y-axis: the vertical number line that runs up and down the Cartesian Plane.

y-Intercept: the value on the y-axis when the x-axis is equal to zero.
References