LINEAR RELATIONSHIPS

Linear relationships refer to two quantities that are related with a linear equation. Since a linear equation is a line, a linear relationship refers to two quantities on a line and their relationship to one another. This relationship can be direct or inverse.

- **Direct variation** refers to two variables that are related because the ratio of their values is always the same. If y varies directly as x, it means if y is doubled, then x is doubled. The formula for a direct variation is y = kx, where k is the constant of variation.

- Linear relationships can also be represented when graphed. The graph of a linear **inequality** can also be graphed. When a linear inequality is g… of the g…

- **S…** A **line** **c**… …m the li…

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The table shows a **direct variation**. What is the constant of variation?

y	x
1	2
2	4
3	6
4	8
5	10

The table shows a direct variation, which means that y varies directly as x. The ratio of their values are 1/2 = 2/4 = 3/6 = 4/8 = 5/10, the constant of variation is 1/2. If it is known that y varies directly as x, and values are given, such as in the table, other ratios could be found. For example, using the table, what is y when x is 38?

Ex. Since y varies directly as x, 1/2 = y/38 → 38 = 2y → y = 19

This linear relationship could be graphed by using the correct x and y values.

Linear inequalities can also be graphed. Linear inequalities are graphed by replacing the inequality sign with an equal sign and graphing the line. When the line is graphed, it will either be solid if ≤ or ≥, or dashed if < or >. To represent the solution set, the area either above the line is shaded if > or ≥, or the area below the line is shaded if < or ≤. A point in the solution set mple, the

The inequality is graphed correctly because it represents the line y = x - 4, has a solid line for the ≤, and is shaded below the line. When the point (4, -2) is checked, the inequality is true.

Remember to make sure the line is in the form of y = mx + b before graphing in order to get the correct answer.

Try This!

1. If y varies directly as x and y = 12 when x = 8, what is y when x = 24?

2. If y varies directly as x and y = 18 when x = 6, what is the constant of variation?

3. If the inequality, y > 2x + 5, is to be graphed, is the line dashed or solid?

4. I ea above c

5. E uch w