Direct Variation: Direct variation is a situation in which the quantities being compared are directly related.

So,

As one quantity increases (or decreases), the other quantity also increases (or decreases).

Example 1: Find the cost of 10 apples if 4 apples cast $1.

Note: This is direct variation because if one increases the number of apples purchased, one also increases how much he/she will pay.

Example 2: A truck travels 102 mi on 6 gal of gasoline. How far will it travel on 30 gal of gasoline?

Note: As the miles driven increases, the number of gallons of gas also increases; therefore, this is an example of direct variation.

To set-up a proportion involving direct variation

1) Establish two pairs of related data
2) Write one pair of data in the numerators of two ratios
3) Write the other related pair in the denominator of two ratios
4) Form a proportion using the two ratios

Inverse Variation: Inverse variation is a situation in which the quantities being compared are inversely related.

So,

As one quantity increases the other quantity decreases, or as one quantity decreases the other quantity increases.

Example 1: If 5 machines take 12 days to complete a job, how long will it take 8 machines to do the job?

Note: As the number of machines increases, the number of days to complete the job decreases; therefore this is an example of inverse variation.

Example 2: A 10 in. diameter gear is in a mesh with a 5 in. diameter gear. The larger gear has a speed of 25 rpm, at how many rpm does the smaller gear turn?

Note: The larger gear would turn slower than the smaller gear. The smaller gear turns faster than the larger. So, as the size of the gear increases in diameter, the speed of the gear decreases. This is an example of inverse variation.

To set-up an inverse proportion:

1) Establish two pairs of related data.
2) Arrange one pair as the numerator of one ratio and the denominator of the other ratio.
3) Arrange the other pair so each ratio that contains like measures.
4) Form a proportion using the two ratios.