

Lesson 1.11: Variation

Scientists often use mathematical models to represent real world phenomenon.

They often use an equation the describes the relationship between two _____ .

Direct Variation

Inverse Variation

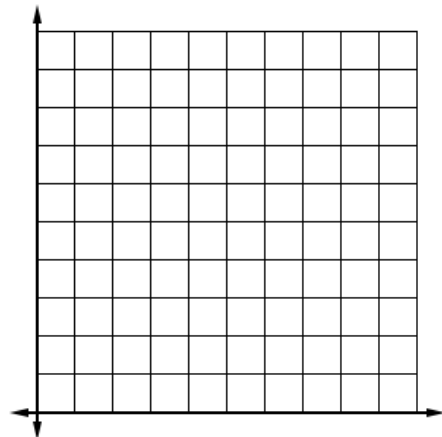
Joint Variation

Examples:

1. During a thunderstorm you see the lightening before you hear the thunder because light travels much faster than sound. The distance between you and the storm varies directly as the time interval between the lightening and the thunder.

a. Suppose that the thunder from a storm 5400 ft away takes 5 s to reach you. Determine the constant of proportionality.

b. Sketch the graph of this equation. What does the constant of proportionality represent?



c. If the time interval between the lightning and thunder is now 8 s, how far away is the storm?

2. Boyle's Law states that when a sample of gas is compressed at a constant temperature, the pressure of the gas is inversely proportional to the volume of the gas.
 - a. Suppose the pressure of a sample of air that occupies 0.106 m^3 at 25°C is 50 kPa . Find the constant of proportionality, and write the equation that expresses the inverse of proportionality.
 - b. If the sample expands to a volume of 0.3 m^3 , find the new pressure.

3. Newton's Law of Gravitation says that two objects with masses m_1 and m_2 attract each other with force F that is jointly proportional to their masses and inversely proportional to the square of the distance r between the objects. Express Newton's Law of Gravitation as an equation.