

Lesson Summary

- A linear functional relationship between a dependent and an independent numerical variable has the form $y = mx + b$ or $y = a + bx$.
- In statistics, a dependent variable is one that is predicted, and an independent variable is the one that is used to make the prediction.
- The graph of a linear function describing the relationship between two variables is a line.

Problem Set

1. The Mathematics Club at your school is having a meeting. The advisor decides to bring bagels and his award-winning strawberry cream cheese. To determine his cost, from past experience he figures 1.5 bagels per student. A bagel costs 65 cents, and the special cream cheese costs \$3.85 and will be able to serve all of the anticipated students attending the meeting
 - a. Find an equation that relates his total cost to the number of students he thinks will attend the meeting.
 - b. In the context of the problem, interpret the slope of the equation in words.
 - c. In the context of the problem, interpret the y -intercept of the equation in words. Does interpreting the intercept make sense? Explain.
2. John, Dawn, and Ron agree to walk/jog for 45 minutes. John has arthritic knees but manages to walk $1\frac{1}{2}$ miles. Dawn walks $2\frac{1}{4}$ miles, while Ron manages to jog 6 miles.
 - a. Draw an appropriate graph, and connect the points to show that there is a linear relationship between the distance that each traveled based on how fast each traveled (speed). Note that the speed for a person who travels 3 miles in 45 minutes, or $\frac{3}{4}$ hour, is found using the expression $3 \div \frac{3}{4}$, which is 4 miles per hour.
 - b. Find an equation that expresses distance in terms of speed (how fast one goes).
 - c. In the context of the problem, interpret the slope of the equation in words.
 - d. In the context of the problem, interpret the y -intercept of the equation in words. Does interpreting the intercept make sense? Explain.

3. Simple interest is money that is paid on a loan. Simple interest is calculated by taking the amount of the loan and multiplying it by the rate of interest per year and the number of years the loan is outstanding. For college, Jodie's older brother has taken out a student loan for \$4,500 at an annual interest rate of 5.6%, or 0.056. When he graduates in four years, he has to pay back the loan amount plus interest for four years. Jodie is curious as to how much her brother has to pay.
- Jodie claims that her brother has to pay a total of \$5,508. Do you agree? Explain. As an example, a \$1,200 loan has an 8% annual interest rate. The simple interest for one year is \$96 because $(0.08)(1200) = 96$. The interest for two years would be \$192 because $(2)(96) = 192$.
 - Write an equation for the total cost to repay a loan of \$ P if the rate of interest for a year is r (expressed as a decimal) for a time span of t years.
 - If P and r are known, is the equation a linear equation?
 - In the context of the problem, interpret the slope of the equation in words.
 - In the context of the problem, interpret the y -intercept of the equation in words. Does interpreting the intercept make sense? Explain.