

Mini-Lecture 1.2

An Introduction to Problem Solving

Learning Objectives:

1. Translate English sentences into mathematical statements.
2. Model and solve direct translation problems.
3. Model and solve mixture problems.
4. Model and solve uniform motion problems.

Preparing for Problem Solving:

Express each English phrase as an algebraic expression.

i) 9 less than a number, t

ii) 2 more than 4 times the height, h

Examples:

1. Translate each of the following English statements into a mathematical statement. Then solve the equation.
 - a) The difference between -12 and a number, x , is 20.
 - b) Twice the sum of a number, z , and 3 is the same as 5 times the number.
2. **Consecutive Integers** The sum of three consecutive odd integers is -147 . Find the integers.

3. **Sales Tax** Cheryl purchased a new 4 GB iPod nano for \$268.75. If this price includes sales tax at the rate of 7.5%, what is the price of iPod without taxes?

SIMPLE INTEREST FORMULA

If a principal of P dollars is borrowed for a period of t years at an annual interest rate r , expressed as a decimal, the interest I charged is

$$I = Prt$$

Interest charged according to this formula is called **simple interest**.

4. **Investments** Amelia just received a \$9000 bonus. She has been advised to invest her bonus in two accounts, one yielding 3% per annum and the other 8% per annum. If Amelia wants to earn \$580 in interest, how much should she put in each account?
5. **Candy Store** Valentine's Day is coming up so Andy decided to buy chocolates for his co-workers at \$4.50 per pound and truffles for his girlfriend at \$7.50 per pound. If he purchased a total of 11 pounds of candy and spent \$58.50, how many pounds of each type did he buy?

UNIFORM MOTION FORMULA

If an object moves at an average speed r , the distance d covered in time t is given by the formula

$$d = rt$$

6. **Boats** Two boats are traveling towards the same port from opposite directions. They are 63 miles apart and one boat is traveling 6 mph faster than the other. If the boats both reach the port in 4 hours and 30 minutes, find the speed for each.