

Solving Word Problems Using Linear Equations - Part 1

Video Lecture

Sections 2.4 and 2.5

Course Learning Objective:

Solve applications of linear equations.

Weekly Learning Objectives:

- 1) Apply the 6-step problem solving strategy for solving problems involving direct translations.**
- 2) Apply the 6-step problem solving strategy for solving problems involving relationships among unknown quantities.**
- 3) Apply the 6-step problem solving strategy for solving problems involving consecutive integers.**
- 4) Apply the 6-step problem solving strategy for solving problems involving supplementary and complementary angles.**

Solving Word Problems Using Linear Equations – Part 1

Suggested Guidelines for solving an applied problem:

- 1) Read the problem carefully until you clearly understand what the problem is saying and what is to be found.
- 2) Assign a variable to represent the unknown value. Write down what the variable represents. If there are multiple unknowns, represent them in terms of the same variable. A diagram or chart may help.
- 3) Write an equation using the variable assigned.
- 4) Solve the equation.
- 5) State the answer to the problem using a complete sentence.
- 6) Check the answer in terms of the original problem.

Examples:

Ex: If 2 is subtracted from a number and this difference is tripled, the result is 4 more than the number. Find the number.

Ex: In triangle ABC, the measure of angle A is 141 degrees more than the measure of angle B. The measure of angle B is the same as the measure of angle C. Find the measure of angle A.

Geometry Fact: The sum of the measures of all angles in a triangle is

Ex: The length of a rectangle is two more than three times the width. If the perimeter is 28 inches, find the dimensions of the rectangle.

Perimeter of a Rectangle $P = 2L + 2W$

Supplementary and Complementary Angle Problems

If two angles are complementary, then the two angles add to 90 degrees.

If two angles are supplementary, then the two angles add to 180 degrees.

In a word problem that refers to an angle and its complement or supplement we can ALWAYS set the problem up with the following variables:

$$\text{Original Angle} = x$$

$$\text{Complement Angle} = 90 - x$$

$$\text{Supplement Angle} = 180 - x$$

Ex: Find the measure of an angle such that the difference between the measures of its supplement and three times its complement is 10 degrees.

Ex: Find the measure of an angle such that the sum of the measures of its complement and its supplement is 160 degrees.

Consecutive Integer Problems

Consecutive integers are numbers that follow one another.

Consecutive integers: . . . -2, -1, 0, 1, 2, 3, 4, . . .

Consecutive even integers: . . . , -4, -2, 0, 2, 4, 6, . . .

Consecutive odd integers: . . . , -3, -1, 1, 3, 5, . . .

Several word problems will ask you to find 2 or 3 consecutive integers.

We will assign x to be the first missing integer and define the other integers in terms of x as follows:

Consecutive Integers

$$1^{\text{st}} \text{ integer} = x$$

$$2^{\text{nd}} \text{ integer} = x+1$$

$$3^{\text{rd}} \text{ integer} = x+2$$

Consecutive Even Integers

$$1^{\text{st}} \text{ integer} = x$$

$$2^{\text{nd}} \text{ integer} = x+2$$

$$3^{\text{rd}} \text{ integer} = x+4$$

Consecutive Odd Integers

$$1^{\text{st}} \text{ integer} = x$$

$$2^{\text{nd}} \text{ integer} = x+2$$

$$3^{\text{rd}} \text{ integer} = x+4$$

Ex: If five times the smaller of two consecutive integers is added to three times the larger, the result is 59. Find the integers.

Ex: If the first and third of three consecutive even integers are added, the result is 22 less than three times the second integer. Find the larger integer.

