Section 1.3 Modeling with Linear Equations

Objective: In this lesson you learned how to write and use mathematical models to solve real-life problems.

I. Introduction to Problem Solving (Pages 97–98)

The process of translating phrases or sentences into algebraic expressions or equations is called _______________.

A good approach to mathematical modeling is to use two stages. Begin by . . .

Then, after assigning labels to the quantities in the verbal model, . . .

Some key words or phrases that represent equality are . . .

Some key words or phrases that represent addition are . . .

Some key words or phrases that represent subtraction are . . .

Some key words or phrases that represent multiplication are . . .

Some key words or phrases that represent division are . . .

II. Using Mathematical Models (Pages 98–100)

Example 1: Describe a strategy for solving and then solve the following problem: Tuition payments make up 67% of a college student’s annual income. If the student pays $8375 for tuition in a single year, what is her annual income?
III. Mixture Problems  (Page 101)

Give an example of a mixture problem.

Describe a general strategy for solving mixture problems.

IV. Common Formulas  (Pages 102–103)

Many common types of geometric, scientific, and investment problems use ready-made equations called ____________.

Complete the following list of common formulas for basic geometric figures.

**Perimeter/Circumference**
Square with side length $s$: $P = \underline{\hspace{2cm}}$
Rectangle with width $w$ and length $l$: $P = \underline{\hspace{2cm}}$
Triangle with sides $a$, $b$, and $c$: $P = \underline{\hspace{2cm}}$
Circle with radius $r$: $C = \underline{\hspace{2cm}}$

**Area**
Square with side length $s$: $A = \underline{\hspace{2cm}}$
Rectangle with width $w$ and length $l$: $A = \underline{\hspace{2cm}}$
Triangle with base $b$ and height $h$: $A = \underline{\hspace{2cm}}$
Circle with radius $r$: $A = \underline{\hspace{2cm}}$

**Volume**
Cube with side length $s$: $V = \underline{\hspace{2cm}}$
Rectangular solid with width $w$, length $l$, and height $h$: $V = \underline{\hspace{2cm}}$
Circular cylinder with radius $r$ and height $h$: $V = \underline{\hspace{2cm}}$
Sphere with radius $r$: $V = \underline{\hspace{2cm}}$
Complete the following list of miscellaneous common formulas.

**Temperature**
where $F = \text{degrees Fahrenheit}$ and $C = \text{degrees Celsius}$

$F = \underline{\text{ }}$

**Simple Interest**
where $I = \text{interest}$, $P = \text{principal}$, $r = \text{annual interest rate}$, and $t = \text{time in years}$

$I = \underline{\text{ }}$

**Compound Interest**
where $A = \text{balance}$, $P = \text{principal}$, $r = \text{annual interest rate}$, $n = \text{compoundings per year}$, and $t = \text{time in years}$

$A = \underline{\text{ }}$

**Distance**
where $d = \text{distance traveled}$, $r = \text{rate}$, and $t = \text{time}$

$d = \underline{\text{ }}$

**Additional notes**

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**Homework Assignment**

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Exercises