3.2 Solving Application Problems

1. Use the problem-solving procedure.
2. Set up and solve number application problems.
3. Set up and solve application problems involving money.
4. Set up and solve applications concerning percent.

1. Use the Problem-Solving Procedure

Many types of application problems can be solved using algebra. In this section we introduce several types. In Sections 3.3 and 3.4 we introduce additional types of applications. They are also presented in many other sections and exercise sets throughout the book. Your instructor may not have time to cover all the applications given in this book. If not, you may still wish to spend some time on your own reading those problems just to get a feel for the types of applications presented.

To be prepared for this section, you must understand the material presented in Section 3.1. The best way to learn how to set up an application or word problem is to practice. The more problems you study and attempt, the easier it will become to solve them.

The general problem-solving procedure given in Section 1.2 can be used to solve all types of verbal problems. Below, we present the **five-step problem-solving procedure** again so you can easily refer to it. We have included some additional information under steps 1 and 2, since in this section we are going to emphasize translating application problems into equations.

### Problem-Solving Procedure for Solving Applications

1. **Understand the problem.** Identify the quantity or quantities you are being asked to find.
2. **Translate the problem into mathematical language (express the problem as an equation).**
   a) Choose a variable to represent one quantity, *and write down exactly what it represents*. Represent any other quantity to be found in terms of this variable.
   b) Using the information from step a), write an equation that represents the application.
3. **Carry out the mathematical calculations (solve the equation).**
4. **Check the answer (using the original application).**
5. **Answer the question asked.**

Sometimes we will combine two steps in the problem-solving procedure when it helps to clarify the explanation. We may not show the check of a problem to save space. Even if we do not show a check, you should check the problem yourself and make sure your answer is reasonable and makes sense.

Let's now set up and solve some application problems using this procedure.
1. Find 3 consecutive even integers.

\[ x = \text{1st even} \]
\[ x+2 = \text{2nd even} \]
\[ x+4 = \text{3rd even integer} \]

**Equation:** Sum is 66

\[ x + (x+2) + (x+4) = 66 \]

\[ 3x + 6 = 66 \]

\[ 3x = 60 \]

\[ x = 20 \]

\[ x+2 = 22 \]
\[ x+4 = 24 \]
2. a) Find time in years to reach 7125

b) \( t = \) time

c) Equation

\[
\frac{3000 + 250t}{3000} = \frac{7125}{3000}
\]

\[
\frac{250t}{250} = \frac{4125}{250}
\]

\( t = 16.5 \text{ yrs} \)
3) How far can a person drive in 2 days with $140.33? 

b) Find miles = m

c) \[\text{Equation}\]
\[
2(41) + .19m = 160.33 \\
82 + .19m = 140.33 \\
-82 \\
.19m = 58.33 \\
\frac{.19}{.19} \\
\text{309 miles} = m
(y) a) Find Original Price of Dress
   b) $d =$ cost of the dress originally
   c) Original Price $-$ Discount = Sale Price

\[
d - 0.30d = 55.99
\]
\[
0.70d = 55.99
\]
\[
d = 79.99
\]