

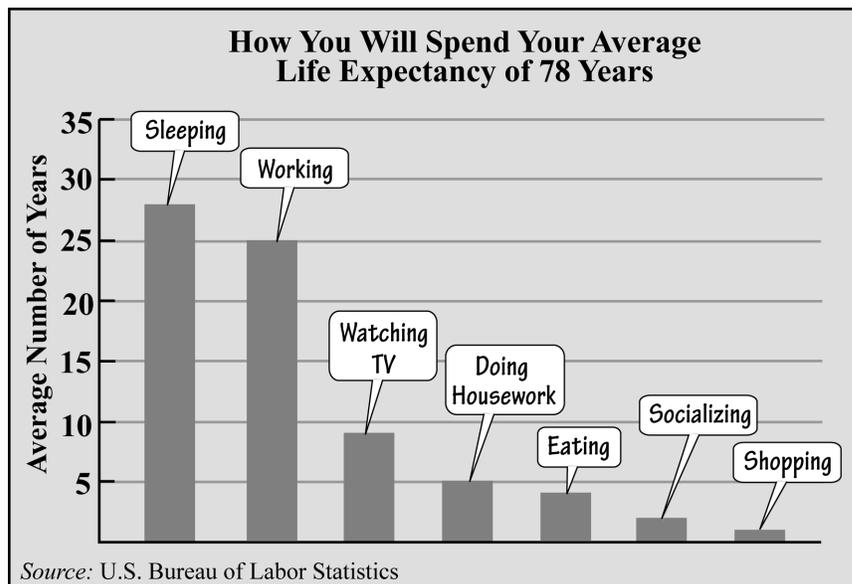
Section 2.5

An Introduction to Problem Solving

What are you doing with your life?

The bar graph shows the average number of years you will devote to seven of your most time-consuming activities.

In the Exercise Set of this section you will use problem solving techniques to take a closer look at how much time you sleep, watch TV, etc.



First Steps:

- Take **comprehensive notes** from your instructor's lecture and insert your notes into this section of the *Learning Guide*. Be sure to write down all examples, definitions, and other key concepts. Additional learning resources include the *Lecture Series on DVD*, the *PowerPoints*, and Section 2.5 of your textbook which begins on page 156.
- Complete the *Concept and Vocabulary Check* on page 164 of the textbook.

Guided Practice:

- Review each of the *Solved Problems* and complete each *Pencil Problem* on the following pages.

Objective #1: Translate English phrases into algebraic expressions.

✓ Solved Problem #1

For each of the following, let x represent the number. Use the given conditions to write an expression.

1a. Five more than a number

$$x + 5$$

1b. A number decreased by 5

$$x - 5$$

1c. Five times a number

$$5x$$

1d. A number divided by 3

$$\frac{x}{3}$$

1e. Three times the sum of 1 and twice a number

$$3(1 + 2x)$$

✎ Pencil Problem #1 ✎

For each of the following, let x represent the number. Use the given conditions to write an expression.

1a. A number increased by 60

1b. A number decreased by 23

1c. The product of 7 and a number

1d. The quotient of a number and 19

1e. Twice the sum of four and a number

Achieving Success!

Do not expect to solve every word problem immediately. As you read each problem, underline the important parts. It's a good idea to read the problem at least twice.

Be persistent, but use the “Ten Minutes of Frustration” Rule. If you have exhausted every possible means for solving a problem and you are still bogged down, stop after ten minutes. Put a question mark by the exercise and move on. When you return to class, ask your professor for assistance.



Objective #2: Solve algebraic word problems using linear equations.
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 **Solved Problem #2**

- 2a.** Four subtracted from six times a number is 68.
Find the number.

Let x = the number.

$$6x - 4 = 68$$

$$6x - 4 + 4 = 68 + 4$$

$$6x = 72$$

$$x = 12$$

The number is 12.

 **Pencil Problem #2** 

- 2a.** If the quotient of three times a number and five is increased by four, the result is 34.
Find the number.

- 2b.** Page numbers on facing pages of a book are consecutive integers. Two pages that face each other have 145 as the sum of their page numbers.
What are the page numbers?

Let x = the page number of the first facing page.

Let $x + 1$ = the page number of the second facing page.

$$x + (x + 1) = 145$$

$$x + x + 1 = 145$$

$$2x + 1 = 145$$

$$2x + 1 - 1 = 145 - 1$$

$$2x = 144$$

$$x = 72$$

$$x + 1 = 73$$

The page numbers are 72 and 73.

- 2b.** Page numbers on facing pages of a book are consecutive integers. Two pages that face each other have 629 as the sum of their page numbers.
What are the page numbers?

- 2c.** A taxi charges \$2.00 to turn on the meter plus \$0.25 for each eighth of a mile.
If you have \$10.00, how many eighths of a mile can you go? How many miles is that?

Let x = the number of eighths of a mile traveled.

$$2 + 0.25x = 10$$

$$2 - 2 + 0.25x = 10 - 2$$

$$0.25x = 8$$

$$\frac{0.25x}{0.25} = \frac{8}{0.25}$$

$$x = 32$$

You can go 32 eighths of a mile.

That is equivalent to $\frac{32}{8} = 4$ miles.

- 2c.** A car rental agency charges \$200 per week plus \$0.15 per mile to rent a car. How many miles can you travel in one week for \$320?

2d. After a 40% price reduction, an exercise machine sold for \$564. What was the exercise machine's price before this reduction?

Let x = the original price.

Original price	minus	the reduction (40% of original price)	is	the reduced price, \$564
x	-	$0.4x$	=	564
$x - 0.4x = 564$				
$0.6x = 564$				
$\frac{0.6x}{0.6} = \frac{564}{0.6}$				
$x = 940$				

The original price was \$940.

2d. Including 6% sales tax, a car sold for \$23,850. Find the price of the car before the tax was added.

Answers for Pencil Problems (Textbook Exercise references in parentheses):

1a. $x + 60$ (2.5 #1) **1b.** $x - 23$ (2.5 #3) **1c.** $7x$ (2.5 #5) **1d.** $\frac{x}{19}$ (2.5 #7) **1e.** $2(x + 4)$ (2.5 #15)

2a. $\frac{3x}{5} + 4 = 34$; 50 (2.5 #19) **2b.** pages 314 and 315 (2.5 #25) **2c.** 800 miles (2.5 #29)

2d. \$22,500 (2.5 #43)

Homework:

- Review the Section 2.5 summary** on page 201 of the textbook.
- Insert your homework** into this section of the *Learning Guide*. Show all work neatly and check your answers. Strive to work through difficulties when possible, making note of any exercises where you need additional help. Remember, even if your instructor assigns homework through *MyMathLab*, you should still write out your work.