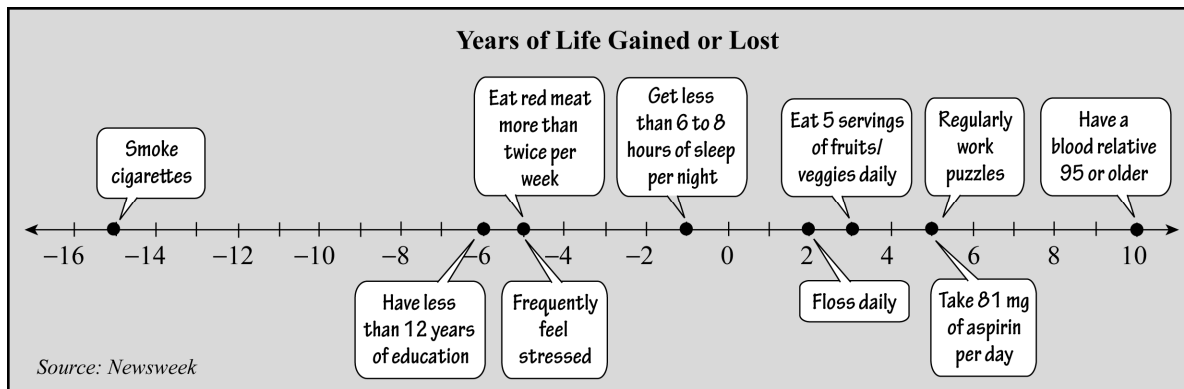


Section 1.6 Subtraction of Real Numbers

Stretching and Shrinking One's Life Span

Life expectancy for the average American man is 75.2 years.
Life expectancy for the average American woman is 80.4 years.

The number line below, with points representing eight integers, indicates factors, many within our control, that can stretch or shrink one's probable life span.



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 1.6 of your textbook which begins on page 65.
- Complete the *Concept and Vocabulary Check* on page 70 of the textbook.

Guided Practice:

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

Objective #1: Subtract real numbers.

✓ *Solved Problem #1*

1a. Subtract: $-7 - (-2)$

Change the subtraction to addition, and replace -2 with its opposite, 2.

$$\begin{aligned} -7 - (-2) &= -7 + 2 \\ &= -5 \end{aligned}$$

✎ *Pencil Problem #1* ✎

1a. Subtract: $3 - (-20)$

1b. Subtract: $-\frac{3}{5} - \frac{1}{3}$

Change the subtraction to addition, and replace $\frac{1}{3}$ with its opposite, $-\frac{1}{3}$.

$$\begin{aligned} -\frac{3}{5} - \frac{1}{3} &= -\frac{3}{5} + \left(-\frac{1}{3}\right) \\ &= -\frac{9}{15} + \left(-\frac{5}{15}\right) \\ &= -\frac{14}{15} \end{aligned}$$

1b. Subtract: $\frac{3}{7} - \frac{5}{7}$

1c. Subtract: $5\pi - (-2\pi)$

Change the subtraction to addition, and replace -2π with its opposite, 2π .

$$\begin{aligned} 5\pi - (-2\pi) &= 5\pi + 2\pi \\ &= 7\pi \end{aligned}$$

1c. Subtract: $1.3 - (-1.3)$

Objective #2: Simplify a series of additions and subtractions.

 **Solved Problem #2**

2. Simplify: $10 - (-12) - 4 - (-3) - 6$

$$\begin{aligned} 10 - (-12) - 4 - (-3) - 6 \\ &= 10 + 12 + (-4) + 3 + (-6) \\ &= (10 + 12 + 3) + [(-4) + (-6)] \\ &= 25 + (-10) \\ &= 15 \end{aligned}$$

 **Pencil Problem #2** 

2. Simplify: $-23 - 11 - (-7) + (-25)$

Objective #3: Use the definition of subtraction to identify terms.

<p style="text-align: center;"> Solved Problem #3</p> <p>3. Identify the terms of the algebraic expression: $-6 + 4a - 7ab$</p> <p>The terms are -6, $4a$, and $-7ab$.</p>	<p style="text-align: center;"> Pencil Problem #3 </p> <p>3. Identify the terms of the algebraic expression: $12x - 5xy - 4$</p>
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Objective #4: Use the subtraction definition to simplify algebraic expressions.
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<p style="text-align: center;"> Solved Problem #4</p> <p>4a. Simplify: $4 + 2x - 9x$</p> $4 + 2x - 9x = 4 + (2 - 9)x$ $= 4 + [2 + (-9)]x$ $= 4 - 7x$	<p style="text-align: center;"> Pencil Problem #4 </p> <p>4a. Simplify: $4 + 7y - 17y$</p>
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- 4b. Simplify: $-3x - 10y - 6x + 14y$

$$\begin{aligned}
 -3x - 10y - 6x + 14y &= -3x - 6x - 10y + 14y \\
 &= (-3 - 6)x + (-10 + 14)y \\
 &= -9x + 4y
 \end{aligned}$$

- 4b. Simplify: $4 - 6b - 8 - 3b$

Objective #5: Solve problems involving subtraction.**✓ Solved Problem #5**

- 5a.** The peak of Mount Everest is 8848 meters above sea level. The Marianas Trench, on the floor of the Pacific Ocean, is 10,915 meters below sea level. What is the difference in elevation between the peak of Mount Everest and the Marianas Trench?

$$8848 - (-10,915) = 8848 + 10,915 = 19,763$$

The difference in elevation between the peak of Mount Everest and the Marianas Trench is 19,763 meters.

 Pencil Problem #5 

- 5a.** The peak of Mount Kilimanjaro, the highest point in Africa, is 19,321 feet above sea level. Qattara Depression, Egypt, one of the lowest points in Africa, is 436 feet below sea level. What is the difference in elevation between the peak of Mount Kilimanjaro and the Qattara Depression?

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

1a. 23 (1.6 #9) **1b.** $-\frac{2}{7}$ (1.6 #27) **1c.** 2.6 (1.6 #43)

2. -52 (1.6 #59)

3. $12x$, $-5xy$, and -4 (1.6 #71)

4a. $4 - 10y$ (1.6 #75) **4b.** $-4 - 9b$ (1.6 #79)

5. 19,757 feet (1.6 #95)

Homework:

- Review the Section 1.6 summary** on page 106 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.