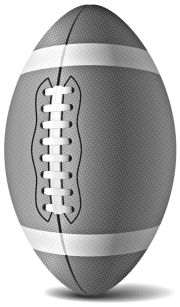
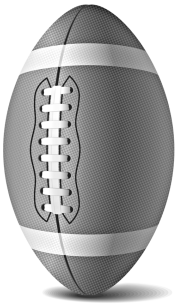
Section 1.5
Addition of Real Numbers



First and Ten!!!

The rules of football can be confusing sometimes. One of the objectives that is usually obvious to most people is that your team's offense desires to move the ball down field.

One of the application exercises in this section of your textbook uses the concept of adding signed numbers to analyze the result of several consecutive plays.



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 1.5 of your textbook which begins on page 56.
- ☐ Complete the ***Concept and Vocabulary Check*** on page 62 of the textbook.

Guided Practice:

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

Objective #1: Add numbers with a number line.

✔ *Solved Problem #1*

1a. Find the sum using a number line: $4+(-7)$

Start at 4 and move 7 units to the left.

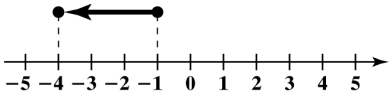
Thus, $4+(-7)=-3$

Pencil Problem #1

1a. Find the sum using a number line: $7+(-3)$

1b. Find the sum using a number line: $-1+(-3)$

Start at -1 and move 3 units to the left.

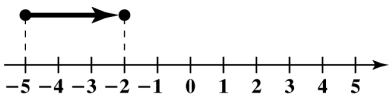


Thus, $-1+(-3)=-4$

1b. Find the sum using a number line: $-2+(-5)$

1c. Find the sum using a number line: $-5+3$

Start at -5 and move 3 units to the right.



Thus, $-5+3=-2$

1c. Find the sum using a number line: $3+(-3)$

Objective #2: Find sums using identity and inverse properties.

✔ *Solved Problem #2*

2. Use the Inverse Property of Addition to add: $6+(-6)$

The sum of a real number and its additive inverse, or opposite, gives 0, the additive identity.

$6+(-6)=0$

✎ *Pencil Problem #2* ✎

2. Use the Identity Property of Addition to add: $-7+0$

Objective #3: Add numbers without a number line.

✔ *Solved Problem #3*

3a. Add without using a number line: $-10+(-25)$

$-10+(-25)=-35$

✎ *Pencil Problem #3* ✎

3a. Add without using a number line: $-8+(-10)$

3b. Add without using a number line: $-\frac{2}{3}+\left(-\frac{1}{6}\right)$

$$-\frac{2}{3}+\left(-\frac{1}{6}\right)=-\frac{4}{6}+\left(-\frac{1}{6}\right)$$
$$=-\frac{5}{6}$$

3b. Add without using a number line: $\frac{9}{10}+\left(-\frac{3}{5}\right)$

3c. Add without using a number line: $-0.4+1.6$

$-0.4+1.6=1.2$

3c. Add without using a number line: $-3.6+(-2.1)$

Objective #4: Use addition rules to simplify algebraic expressions.

✔ ***Solved Problem #4***

4a. Simplify: $-20x+3x$

$$\begin{aligned}-20x+3x &= (-20+3)x \\ &= -17x\end{aligned}$$

Pencil Problem #4

4a. Simplify: $25y+(-12y)$

4b. Simplify: $3y+(-10z)+(-10y)+16z$

$$\begin{aligned}&3y+(-10z)+(-10y)+16z \\ &= 3y+(-10y)+(-10z)+16z \\ &= \left[3+(-10)\right]y+\left[(-10)+16\right]z \\ &= -7y+6z\end{aligned}$$

4b. Simplify: $4y+(-13z)+(-10y)+17z$

4c. Simplify: $5(2x+3)+(-30x)$

$$\begin{aligned}5(2x+3)+(-30x) &= 10x+15+(-30x) \\ &= 10x+(-30x)+15 \\ &= \left[10+(-30)\right]x+15 \\ &= -20x+15\end{aligned}$$

4c. Simplify: $8(4y+3)+(-35y)$

Objective #5: Solve applied problems using a series of additions.

✔ *Solved Problem #5*

5. The water level of a reservoir is measured over a five-month period. During this time, the level rose 2 feet, then fell 4 feet, then rose 1 foot, then fell 5 feet, and then rose 3 feet. What was the change in the water level at the end of the five months?

the level rose 2 feet: 2
then fell 4 feet: -4
then rose 1 foot: 1
then fell 5 feet: -5
and then rose 3 feet: 3

$$\begin{aligned} 2+(-4)+1+(-5)+3 &= (2+1+3)+\left[(-4)+(-5)\right] \\ &= 6+(-9) \\ &= -3 \end{aligned}$$

At the end of 5 months the water level was down 3 feet.

✎ *Pencil Problem #5* ✎

5. The temperature at 8:00 a.m. was -7°F.
By noon it had risen 15°F, but by 4:00 p.m. it had fallen 5°F.
What was the temperature at 4:00 p.m.?

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

1a. 4 *(1.5 #1)* **1b.** -7 *(1.5 #3)* **1c.** 0 *(1.5 #7)*

2. -7 *(1.5 #9)*

3a. -18 *(1.5 #15)* **3b.** $\frac{3}{10}$ *(1.5 #31)* **3c.** -5.7 *(1.5 #29)*

4a. $13y$ *(1.5 #49)* **4b.** $-6y+4z$ *(1.5 #53)* **4c.** $-3y+24$ *(1.5 #59)*

5. 3°F *(1.5 #75)*

Homework:

- ☐ **Review the Section 1.5 summary** that begins on page 105 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.