Note on Notation You have been writing rational numbers with raised signs to avoid confusion with the symbols for addition and subtraction. However, most computer software and most writing in mathematics do not use raised signs. Positive numbers are usually written without a sign.

$$^{+}3 = 3 \text{ and } ^{+}7.5 = 7.5$$

Negative numbers are usually written with a dash like a subtraction sign.

$$^{-}3 = -3 \text{ and } ^{-}7.5 = -7.5$$

From now on, we will use this notation to indicate a negative number. This can be confusing if you don't read carefully. Parentheses can help.

$$^{-}5 - ^{-}8 = -5 - -8 = -5 - (-8)$$

The subtraction symbol also indicates the opposite of a number. For example, -8 represents the opposite of 8. The expression $-(-8)$ represents the opposite of -8.

$$-(-8) = 8$$

2.4 Fact Families

You have written fact families for whole numbers:

$$3 + 2 = 5$$

$$2 + 3 = 5$$

$$5 - 3 = 2$$

$$5 - 2 = 3$$

Do the relationships below work for positive and negative numbers?

$$a + b = c \quad a = c - b \quad b = c - a$$

Problem 2.4

A For each part, choose values for a and b. Substitute those values into the three relationships below.

$$a + b = c \qquad a = c - b \qquad b = c - a$$

Then find the value of c.

1. a and b are positive rational numbers.
2. a and b are negative rational numbers.
3. a is a positive rational number, and b is a negative rational number.
4. a is a negative rational number, and b is a positive rational number.

For Questions B–E, use fact families to answer each question.

B Write a related subtraction sentence for each.

1. $-3 + (-2) = -5$
2. $25 + (-32) = -7$

C Write a related addition sentence for each.

1. $8 - (-2) = 10$
2. $-14 - (-20) = 6$

D

1. Write a related sentence for each.

   a. $n - 5 = 35$ **b.** $n - (-5) = 35$ **c.** $n + 5 = 35$

2. Do your related sentences make it easier to find the value of n? Why or why not?

E

1. Write a related sentence for each.

   a. $4 + n = 43$ **b.** $-4 + n = 43$ **c.** $-4 + n = -43$

2. Do your related sentences make it easier to find the value of n? Why or why not?

ACE Homework starts on page 44.