KEY CONCEPT *For Your Notebook*

Rules of Addition

Words To add two numbers with the *same* sign, add their absolute values. The sum has the same sign as the numbers added.

Examples $8 + 7 = 15$ $\quad -6 + (-10) = -16$

Words To add two numbers with *different* signs, subtract the lesser absolute value from the greater absolute value. The sum has the same sign as the number with the greater absolute value.

Examples $-12 + 7 = -5$ $\quad 18 + (-4) = 14$

EXAMPLE 2 Add real numbers

Find the sum.

a. $-5.3 + (-4.9) = -(|-5.3| + |-4.9|)$ **Rule of same signs**

$= -(5.3 + 4.9)$ **Take absolute values.**

$= -10.2$ **Add.**

b. $19.3 + (-12.2) = |19.3| - |-12.2|$ **Rule of different signs**

$= 19.3 - 12.2$ **Take absolute values.**

$= 7.1$ **Subtract.**

PROPERTIES OF ADDITION Notice that both $3 + (-2)$ and $-2 + 3$ have the same sum, 1. So, $3 + (-2) = -2 + 3$. This is an example of the *commutative property of addition*. The properties of addition are listed below.

KEY CONCEPT *For Your Notebook*

Properties of Addition

COMMUTATIVE PROPERTY The order in which you add two numbers does not change the sum.

Algebra $a + b = b + a$ $\quad$ **Example** $3 + (-2) = -2 + 3$

ASSOCIATIVE PROPERTY The way you group three numbers in a sum does not change the sum.

Algebra $(a + b) + c = a + (b + c)$ $\quad$ **Example** $(-3 + 2) + 1 = -3 + (2 + 1)$

IDENTITY PROPERTY The sum of a number and 0 is the number.

Algebra $a + 0 = 0 + a = a$ $\quad$ **Example** $-5 + 0 = -5$

INVERSE PROPERTY The sum of a number and its opposite is 0.

Algebra $a + (-a) = -a + a = 0$ $\quad$ **Example** $-6 + 6 = 0$