

Section 2.3 Subtraction with Negative Numbers

1. Definition of Subtraction: If a and b are any two numbers, then it is true that:

$$a - b = a + (-b)$$

Subtracting a number is the same as adding its opposite.

Example: Write each of the given subtraction problems as an equivalent addition problem using the definition of subtraction.

a. $14 - 7 = 14 + (-7)$

b. $9 - (-4) = 9 + [-(-4)] = 9 + 4$

c. $-13 - 5$

d. $-14 - 8$

e. $17 - 9$

f. $-15 - (-4)$

g. $-13 - (-3)$

h. $17 - (-6)$

i. $35 - (-4)$

2. Subtraction with Negative Numbers: To subtract two numbers, rewrite the expression as "addition of the opposite", and then apply the addition rules.

Example: Simplify.

a. $-7 - 5$

$$= -7 + (-5) \quad \text{change subtraction to addition of the opposite}$$

$$= -12 \quad \text{apply rule for adding numbers that have the same sign}$$

b. $-8 - (-5)$

$$= -8 + [-(-5)] \quad \text{change subtraction to addition of the opposite}$$

$$= -8 + 5 \quad \text{apply rule } -(-a) = a$$

$$= -3 \quad \text{apply rule for adding numbers that have different signs}$$

Example: Simplify each of the following.

a. $17 - (-10)$

b. $-3 - 10$

c. $4 - 10$

d. $-15 - (-4)$

e. $-18 - 14$