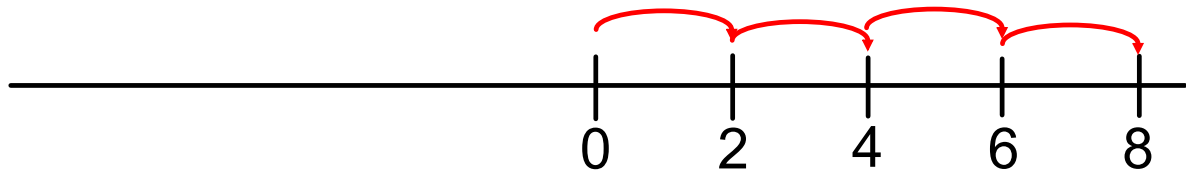# Multiplying Integers

Let x = # of steps taken
(negative means face the other way)

Let y = Length of each step
(negative means walk backwards)
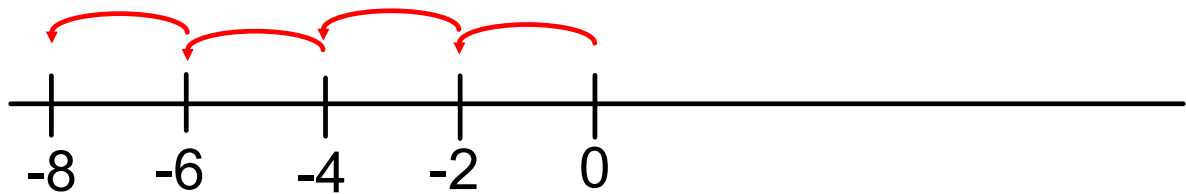
What is
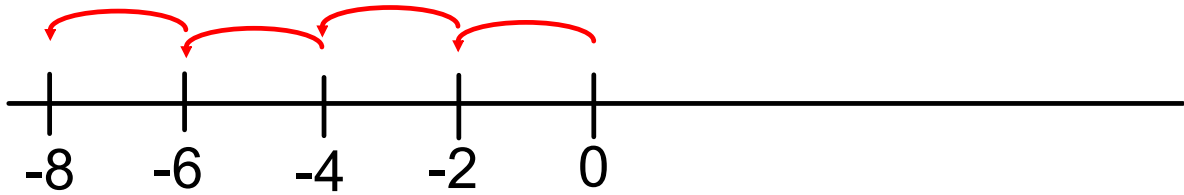multiplying?

Repeated
addition

$$0 \quad 2 \quad 4 \quad 6 \quad 8$$

4 x 2 means:

facing to the right (x is positive), take 4
steps forward (y is positive) of length 2

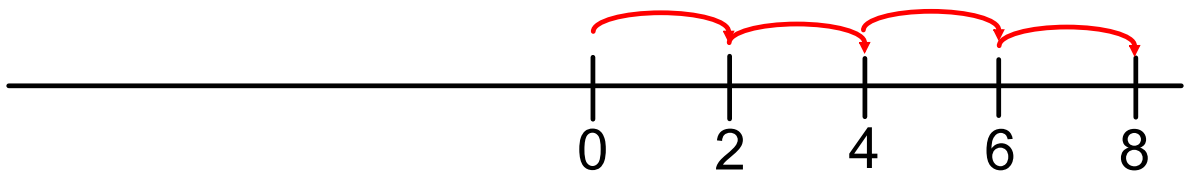$$-8 \quad -6 \quad -4 \quad -2 \quad 0$$

-4 x 2 means:

facing to the left (x is negative), take 4
steps forward (y is positive) of length 2

-8   -6   -4   -2   0

4 x -2 means:

facing to the right (x is positive), take 4
steps backwards (y is negative) of length 2

0   2   4   6   8

-4 x -2 means:

facing to the left (x is negative), take 4
steps backwards (y is negative) of length 2

$$3 \times (-5) = -15$$
$$(-5) + (-5) + (-5)$$

$$(-4) \times 6 = -24$$
$$(-4) + (-4) + (-4) + (-4)$$
$$+ (-4) + (-4)$$

$$5 \times 4 = 20$$
$$-4 \times -3 = 12$$

$$(-) \times (+) \times (-)$$

$$(-) \times (-)$$

$$+$$

$$(+) \times (-) \times (+)$$

$$(-) \times (+)$$

$$-$$

$$(-) \times (-) \times (+) \times (-) \times (-) \times (-)$$

#. of negatives

if ODD ⟹ negative

if. EVEN ⟹ positive

Example 1: Find Integer Products

Find each product.

a) -4×3
b) $5 \times (-2)$
c) $-7 \times (-4)$

a) $4 \times 3 = 12$
$(-) \times (+) = -$
$\Rightarrow -12$

b) $5 \times 2 = 10$
$(+) \times (-) = -$
$\Rightarrow -10$

c) $7 \times 4 = 28$
$(-) \times (-) = +$
$\Rightarrow 28$

Example 2: Apply Integer Multiplication

Six students each owe $5 for a field trip. What is the total amount owed?
What integer rule does this illustrate?

$$6 \times \$5 = \$30 \text{ is owed}$$

$$6 \times (-5) = -30$$

Example 3: Multiply More Than Two Integers

Find each product.

a) $5 \times (-9) \times (-3)$

b) $-2 \times (-4) \times (-7) \times 2$

Product means multiply

a) $5 \times 9 \times 3 = 135$
$(+) \times (-) \times (-) = +$
$\Rightarrow 135$

b) $2 \times 4 \times 7 \times 2 = 112$
$(-) \times (-) \times (-) \times (+) = -$
$\Rightarrow -112$

Key Ideas

● When you multiply two integers,
  – if the signs are the same, the product is positive
  – if the signs are different, the product is negative

$5 \times 5 = 25$ and
$-4 \times (-4) = 16$

$5 \times (-5) = -25$ and
$-5 \times 5 = -25$

Page 364 #s 4 - 21