



# Multiplying Integers

CA Standards  
NS 1.2  
AF 1.3

**Goal:** Multiply integers.

## Vocabulary

Multiplicative identity: **The number 1**

## Multiplying Integers

### Words

The product of two integers

with the same sign is **positive**.

The product of two integers

with different signs is **negative**.

### Numbers

$$3 \cdot 5 = \mathbf{15}$$

$$-4 \cdot (-6) = \mathbf{24}$$

$$3 \cdot (-5) = \mathbf{-15}$$

$$-4 \cdot 6 = \mathbf{-24}$$

## EXAMPLE 1 Multiplying Integers

a.  $5(-6) = \mathbf{-30}$

Different signs, so product is **negative**.

b.  $-2(-3) = \mathbf{6}$

Same sign, so product is **positive**.

c.  $-9(4)(-2) = \mathbf{-36}(-2)$   
 $= \mathbf{72}$

Multiply from left to right.

Multiply.

## EXAMPLE 2 Finding Powers of Integers

a.  $(-2)^3 = (\mathbf{-2})(\mathbf{-2})(\mathbf{-2})$

Write as a repeated product.

$$= (\mathbf{4})(-2)$$

Multiply from left to right.

$$= \mathbf{-8}$$

Multiply.

b.  $-2^3 = -(\mathbf{2^3})$

Use order of operations.

$$= \mathbf{-8}$$

Evaluate power.

**Guided Practice** Find the product.

1. $-8(7)$  _____	2. $9(-4)$  _____	3. $-7(-12)$  _____	4. $-2(-10)(-9)$  _____
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Find the power.

5. $(-3)^3$  _____	6. $-3^3$  _____	7. $-5^4$  _____	8. $(-5)^4$  _____
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**EXAMPLE 3** Evaluating an Expression Involving Multiplication

**Catapult** A catapult launches a water balloon 10 feet above the ground with a velocity of 30 feet per second. The expression  $-16t^2 + 30t + 10$  gives the balloon's height (in feet) above the ground after  $t$  seconds. How high is the water balloon after 2 seconds?

**Solution**

Evaluate the expression for the height when  $t = 2$ .

$$\begin{aligned} -16t^2 + 30t + 10 &= -16(\boxed{2})^2 + 30(\boxed{2}) + 10 && \text{Substitute } \boxed{2} \text{ for } t. \\ &= -16(\boxed{4}) + 30(\boxed{2}) + 10 && \text{Evaluate the power.} \\ &= \boxed{-64} + \boxed{60} + 10 && \text{Multiply.} \\ &= \boxed{6} && \text{Add.} \end{aligned}$$

**Answer:** After 2 seconds, the water balloon is  $\boxed{6}$  feet above the ground.

## Multiplication Properties

### Multiplication Property of Zero

**Words** The product of a number and 0 is  $0$ .

**Numbers**  $-2 \cdot 0 = 0$

**Algebra** For any value of  $a$ ,  $a \cdot 0 = 0$ .

### Identity Property of Multiplication

**Words** The product of a number and  $1$  is the number.

**Numbers**  $7(1) = 7$

**Algebra** For any value of  $a$ ,  $a(1) = a$ .

### Closure Property of Multiplication

The product of two integers is an integer.

## EXAMPLE 4 Using Multiplication Properties

Find the product.

a.  $21(1)$

b.  $-8(0)$

**Solution**

a.  $21(1) = 21$

Identity property of multiplication

b.  $-8(0) = 0$

Multiplication property of zero

**Guided Practice** Find the product. Identify any multiplication properties you use.

9.  $9(0)$

10.  $-7(1)$

11.  $-12$

12.  $1(-16)$

## Homework