Multiplying Integers

What You'll Learn

To multiply integers and to solve problems by multiplying integers

Why Learn This?

Computers multiply time by a negative rate to tell skydivers when to open their parachutes.

Get your numberlines & stickpeople.

Warm ups:
5 + (-8) =

*(-4) + (-9) =*

4 - 6 =

(-5) - (-2) =

Today, we will move on to multipication.

We remember that multiplying is like repeated addition. For example, 6 x 3 means six groups of three, or 3 + 3 + 3 + 3 + 3 + 3 = 18.
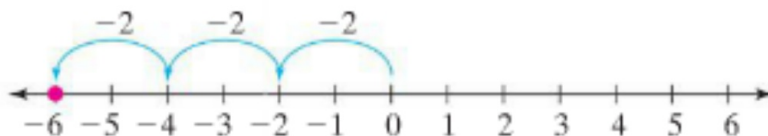
We will build on that knowledge in this lesson.

Recall that multiplication is an easy way to do repeated addition. You can use a number line to multiply integers. Always start at 0.
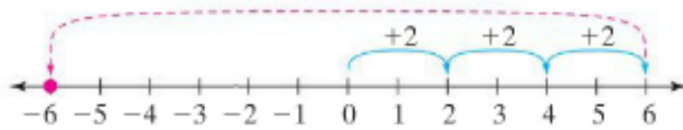
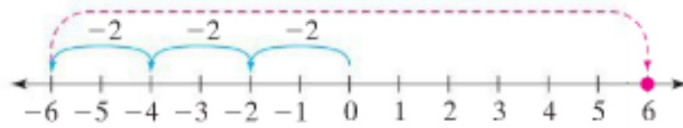3×2 means three groups of 2 each: $3 \times 2 = 6$.
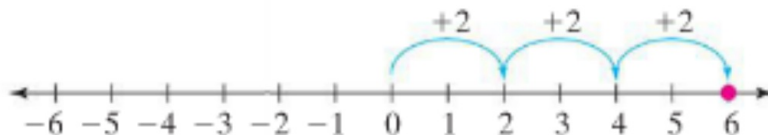
$3 \times (-2)$ means three groups of -2 each: $3 \times (-2) = -6$.

The integers 3 and −3 are opposites. You can think of −3 × 2 as the opposite of three groups of 2 each. So −3 × 2 = −6.

You can think of −3 × (−2) as the opposite of three groups of −2 each. Since 3 × (−2) = −6, −3 × (−2) = 6.

Type this in your notes please:

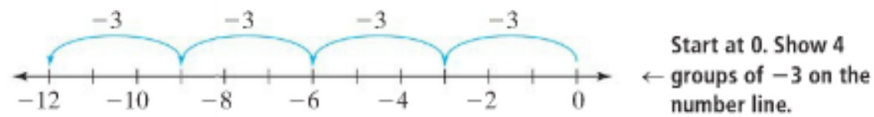You can use the following rules to multiply integers.

KEY CONCEPTS **Multiplying Integers**

The product of two integers with the *same* signs is positive.
The product of two integers with *different* signs is negative.

Examples:

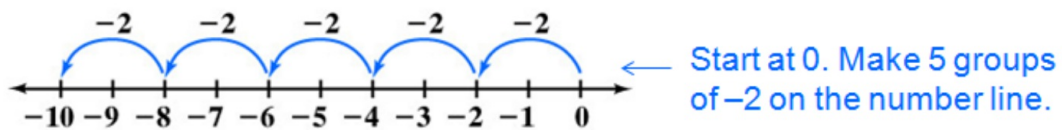$4 \times 5 = 20 \qquad 4 \times (-5) = -20$
$-4 \times (-5) = 20 \qquad -4 \times 5 = -20$

EXAMPLE **Using a Model to Multiply Integers**

1 Use a number line to find $4 \times (-3)$.

Start at 0. Show 4
← groups of −3 on the
number line.

The sum of 4 groups of −3 is −12. So $4 \times (-3) = -12$.

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1 **EXAMPLE** Use a number line to find $5 \times (-2)$.

← Start at 0. Make 5 groups
of −2 on the number line.

The sum of 5 groups of −2 is −10. So, $5 \times (-2) = -10$.

1.   Use a number line to find the product of 3 × (−4).

   A. −1

   B. −7

   C. 12

   D. −12
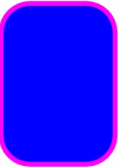
2.   Use a number line to find the product of −3 × (−4).

   A. 12

   B. −12

   C. −7

   D. −1

EXAMPLES Multiplying Integers

2 Find $-5 \times (-6)$.

$-5 \times (-6) = 30$ ← same signs, positive product

3 A skydiver falls 56 meters each second. The skydiver waits 8 seconds before opening her parachute. Use an integer to express the change in the skydiver's elevation.

$(-56) \times 8 = -448$ ← Use a negative number to represent falling.

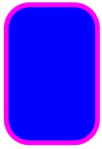The integer -448 expresses the change in the skydiver's elevation.

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2 EXAMPLE Find each product.

a. $-2 \times (-6)$

$-2 \times (-6) = 12$ ← same signs, positive product

b. -7×2

$-7 \times 2 = -14$ ← different signs, negative product

1. Find the product $-9 \times (-3)$.
   A. 12
   B. -27
   C. 27
   D. -12
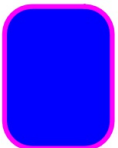
2. Find the product $5 \times (-3)$.
   A. 15
   B. -15
   C. -2
   D. 2
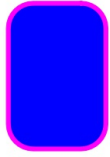
6. -8×4

   A. positive

   B. negative

7. $-3 \times (-5)$

   A. positive

   B. negative

8. $7 \times (-6)$

    A. negative

    B. positive

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Reteaching 11-5

When two integers have like signs, the product will always be positive.

Both integers are positive: $3 \times 4 = 12$
Both integers are negative: $-3 \times (-4) = 12$

When two integers have different signs, the product will always be negative.

One integer positive, one negative: $3 \times (-4) = -12$
One integer negative, one positive: $-3 \times 4 = -12$

Example 1: Find -8×3.

① Determine the product.
$8 \times 3 = 24$

② Determine the sign of the product. Since one integer is negative and one is positive, the product is negative.

③ So $-8 \times 3 = -24$.

Example 2: Find $(-10) \times (-20)$.

① Determine the product.
$10 \times 20 = 200$

② Determine the sign of the product. Since both integers are negative, the product is positive.

③ So $(-10) \times (-20) = 200$.

Find each product.

1. $7 \times (-4)$

_____

2. $-5 \times (-9)$

_____

3. -11×2

_____

4. $8 \times (-9)$

_____

5. $15 \times (-3)$

_____

6. $-7 \times (-6)$

_____

7. -12×6

_____

8. $13 \times (-5)$

_____

9. $-10 \times (-2)$

_____

10. A dog lost 2 pounds per week three weeks in a row. What integer expresses the total change in the dog's weight? _____

Find each quotient.

11. $18 \times (-6)$

_____

12. $-35 \times (-7)$

_____

13. -15×3

_____

14. $28 \times (-4)$

_____

15. $25 \times (-5)$

_____

16. $-27 \times (-9)$

_____

17. -12×4

_____

18. $33 \times (-11)$

_____

19. $-50 \times (-2)$

_____