Algebra IA

Lesson 2.4 **Multiply Real Numbers**

Warm-Up

Find each sum or difference.

(a)
$$-17.3+6.2$$

(b)
$$\frac{2}{3} + \left(-\frac{4}{5}\right) - \left(-\frac{1}{2}\right)$$
 (c) $25.3 - \left(-2.2\right)$

(c)
$$25.3 - (-2.2)$$

$$(d) -4+(-7)$$

$$\frac{20}{30} + \left(-\frac{24}{30}\right) + \left(+\frac{15}{30}\right)$$

The Sign of a Product

Same Signs – the product of two real numbers with the same sign is *positive*

$$2(5) = 10$$

$$-6(-3)=18$$

Different Signs – the product of two real numbers with different signs is negative

$$-8(4) = -32$$

$$7(-5) = -35$$

Example 1. Multiply Real Numbers

Find the product.

(a)
$$-8(-6)$$



(b)
$$-8(3.5)(-4)$$
 $(-2.6)(-4)$

(c)
$$\frac{1}{4}(-12)(3)$$
 $(-3)(3)$

Properties of Multiplication

Commutative Property

$$a \cdot b = b \cdot a$$

$$a \cdot b = b \cdot a$$

$$4 \cdot (-5) = -5 \cdot 4$$

Associative Property

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

$$(-2\cdot7)\cdot4 = -2\cdot(7\cdot4)$$

Identity Property

$$a \cdot 1 = 1 \cdot a = a$$

$$(-5) \cdot 1 = -5$$

Property of Zero

$$a \cdot 0 = 0 \cdot a = 0$$

$$-3.0 = 0$$

Property of -1

$$a \cdot (-1) = -1 \cdot a = -a$$

$$-2 \cdot (-1) = 2$$

Example 2. Identify Properties of Multiplication

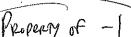
(a)
$$-7 \cdot 0 = 0$$

-7.0=0 (Profesty of Zero

(b)

DOENTITY PROPERTY

(c)
$$-1 \cdot (-13) =$$



(d)
$$-a \cdot b = b \cdot (-a \cdot b)$$

 $(-2.5 \cdot y) \cdot (-4) = -2.5 \cdot (y \cdot (-4))$

ASSOCIATIVE PROPERTY

Trv It!

Find the product.

$$-2(-7) \qquad \boxed{4}$$

$$-0.5(6)(-5) \qquad (-3)(-5) = \boxed{15}$$

$$\frac{4}{3}(-3)(8) \qquad (-4)(8) = -32$$

Identify the property.

$$(y\cdot4)\cdot9 = y\cdot(4\cdot9)$$
 ASSOCIATIVE PROPERTY $-13(-1)=13$ PROPERTY OF $-13(-6)=-6(-5)$ Commutative property

Example 3. Use the Properties of Multiplication

Find the product. Justify each step by naming the property that allows you to make the next step.

(a)
$$-2 \cdot (c \cdot (-0.5))$$

 $-2((-0.5) \cdot c)$ COMMUTATIVE
 $(-2 \cdot (-0.5)) \cdot c$ ASSOCIATIVE
 $| -c$ MULTIPLY

(b) $(-\nu)(-0.5)(-6)$

(-0-5)(-6)(-y) COMMUNATIVE (DOUBLE)

$$(3)(-y)$$

Example 4. Solve a Multi-Step Problem

From 1900 to 1940, a 250-foot wide beach on the Atlantic coast was eroding at a rate of about -0.02 feet per year. From 1940 to 2000, it was eroding at a rate of about -0.12 feet per year. Approximate the width of the beach in 2000.

$$(-0.02)(40) + (-0.12)(60)$$
 250 - 8 = 242
-8 + -7.2 The width of the Beach
Page 91-92 (4-50) even IS 242 Feet IN

IDENTITY

Assignment: Page 91-92 (4 – 50) even

Review:

- 1. The total cost C (in dollars) of a telephone call from the United States to Moscow, Russia is given by C = 0.4t, where t represents the length of the call in minutes.
 - a) Evaluate the equation for t = 5, 10, 15, 20, 25. Organize your results in an input-output table.
 - b) Describe the domain and range of the function whose values are shown in the table.
- 2. The table below shows the daily low temperatures in Petoskey, Michigan during a week in January.
 - a) Which low temperature was the coldest?
 - b) Which days had temperatures above -2°?
 - c) What is the absolute value of Tuesday's temperature?
 - d) List the temperatures in increasing order.

Day	Temp.(°F)
Monday	7°
Tuesday	-3°
Wednesday	2°
Thursday	-7°
Friday	-5°
Saturday	-2°
Sunday	9°

3. On a Saturday morning your parents give you \$15 for your allowance. You spend \$18.50 at the mall. Then you make \$20 baby-sitting that night. Do you end the day with more money than you started with? Write an expression to model the above scenario.