Algebra IA

Lesson 2.4
Multiply Real Numbers

Warm-Up
Find each sum or difference.

(a) $-17.3+6.2$ -11.1

(b) $\frac{2}{3}+\left(-\frac{4}{5}\right)-\left(-\frac{1}{2}\right)$ $\frac{20}{30}+\left(-\frac{24}{30}\right)+\left(+\frac{15}{30}\right)$ $\frac{11}{30}$

(c) $25.3-(-2.2)$ 27.5

(d) $-4+(-7)$ -11

The Sign of a Product

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

Examples: $2(5)=10$ $-6(-3)=18$

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

Examples: $-8(4)=-32$ $7(-5)=-35$

Example 1. Multiply Real Numbers
Find the product.

(a) $-8(-6)$ 48

(b) $-8(3.5)(-4)$ $(-28)(-4)$ 112

(c) $\frac{1}{4}(-12)(3)$ $(-3)(3)$ -9

Properties of Multiplication

	Example
Commutative Property $a\cdot b=b\cdot a$	$4\cdot(-5)=-5\cdot 4$
Associative Property $(a\cdot b)\cdot c=a\cdot(b\cdot c)$	$(-2\cdot 7)\cdot 4=-2\cdot(7\cdot 4)$
Identity Property $a\cdot 1=1\cdot a=a$	$(-5)\cdot 1=-5$
Property of Zero $a\cdot 0=0\cdot a=0$	$-3\cdot 0=0$
Property of –1 $a\cdot(-1)=-1\cdot a=-a$	$-2\cdot(-1)=2$

Example 2. Identify Properties of Multiplication

(a) $-7\cdot 0=0$ Property of Zero

(b) $b\cdot 1=b$ Identity Property

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

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

(e) $(-2.5\cdot y)\cdot(-4)=-2.5\cdot(y\cdot(-4))$ Associative Property

Try It!

Find the product.

$-2(-7)$ 14

$-0.5(6)(-5)$ $(-3)(-5) = 15$

$\frac{4}{3}\left(\frac{-3}{1}\right)(8)$ $(-4)(8) = -32$

Identify the property.

$(y \cdot 4) \cdot 9 = y \cdot (4 \cdot 9)$ ASSOCIATIVE PROPERTY

$-13(-1) = 13$ PROPERTY OF -1

$-5(-6) = -6(-5)$ 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

$1 \cdot c$ MULTIPLY

c IDENTITY

(b) $(-y)(-0.5)(-6)$

$(-0.5)(-6)(-y)$ COMMUTATIVE (Double)

$(3)(-y)$ MULTIPLY

$(3)(-1)(y)$ PROPERTY of -1

$-3y$ MULTIPLY

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.

$(-0.02)(40) + (-0.12)(60)$

$-.8 + -7.2$

-8

$250 - 8 = 242$

The width of the beach is 242 feet in 2000

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.