1.7   Multiplication & Division of Real Numbers

Sign Rules for Multiplication

- positive $\times$ positive = positive

- negative $\times$ negative = positive

- positive $\times$ negative = negative

- negative $\times$ positive = negative

- $a \cdot 0 = 0$

- $0 \cdot a = 0$

Same signs - positive; different signs - negative

Sign Rules for Division

- positive $\div$ positive = positive

- negative $\div$ negative = positive

- positive $\div$ negative = negative

- negative $\div$ positive = negative

- $0 \div a = 0$

- $a \div 0 =$ undefined

Same signs - positive; different signs - negative

What if there are more than two numbers involved? *If there are an even number of negatives, then the result is positive. An odd number of negatives gives a negative result.*

Example 1.7.1. Find $(-2)(3)(-1)(4) =$

Example 1.7.2. Find $(-37)(423)(0)(-55)(-3.7) =$

Other Properties of Multiplication

- Identity: $a \cdot 1 = 1 \cdot a = a$

- Inverse: $a \cdot \dfrac{1}{a} = \dfrac{1}{a} \cdot a = 1$

Division is defined using multiplication. How so?

Let a and b be real numbers with $b \neq 0$, then:

$$a \div b = \frac{a}{b} = a \cdot \frac{1}{b}$$

Negatives with Parentheses

When there is a negative sign in front of a quantity (set of parentheses), distribute a negative one to each term.

Example 1.7.3. Simplify fully:

$$4(3y - 7) - (13y - 2)$$

Example 1.7.4. Simplify fully:
$$-4(-\frac{3}{4}y)$$

Example 1.7.5. Simplify fully:
$$4(2y-3)-(7y+2)$$

Example 1.7.6. Is $x = -8$ a solution to the following equation?
$$4(6-x)+7x=0$$

Example 1.7.7. Is $m = -4$ a solution to the following equation?
$$\frac{5m-1}{6}=\frac{3m-2}{4}$$