

Assigned	Assignment (Check due dates and time assignments are due in mathXL)
Mon. 8/12/2024 Tues. 8/13/2024	Introduction assignment in MathXL: Go to <i>washoeschools.net</i> , click on <i>Students and Parents</i> then scroll down to <i>envision Mathematics</i> *Syllabus Signed *Pay \$3 Lab Fee to Bookkeeper
Wed. 8/14/2024 Thur. 8/15/2024	1.1 Worksheet: Fractions
Fri. 8/16/2024 Mon. 8/19/2024	1.2 MathXL: Order of Operation
Tues. 8/20/2024 Wed. 8/21/2024	1.3 MathXL: Variables, Expressions, and Equations
Thur. 8/22/2024 Fri. 8/23/2024	1.4 MathXL: Real Numbers on the Number Line, Absolute Value
Mon. 8/26/2024 Tues. 8/27/2024	1.5 MathXL: Add and Subtract with Signed Numbers
Wed. 8/28/2024 Thur. 8/29/2024	1.6 MathXL: Multiply and Divide with Signed Numbers
Fri. 8/30/2024 Mon. 9/2/2024	Ch 1 Practice Test
Tues. 9/3/2024 Wed. 9/4/2024	Ch 1 Test

1.1 Fractions

Factors:

Parts which are multiplied

Product:

Answer to a multiplication problem

Prime Number:

A number only divisible by itself and 1

Composite number:

A number made up of multiple factors.

EXAMPLE 1 Factoring Numbers

Write each number as the product of prime factors.

(a) 35

(b) 24

Vocabulary:Fraction:Mixed number:Proper fraction:Improper fraction:Numerator:Denominator:Reciprocals:Zero vs Undefined!**EXAMPLE 2** Writing Fractions in Lowest Terms

Simplify each fraction / Write each in lowest terms:

a) $\frac{12}{15}$

b) $\frac{15}{45}$

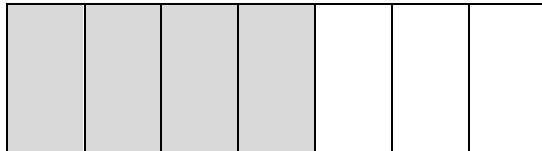
EXAMPLE 3 Multiplying Fractions

Find each product and write it in lowest terms:

a) $\frac{3}{8} \cdot \frac{4}{9}$

b) $\frac{4}{7} \cdot \frac{5}{12}$

*To multiply fractions, multiply numerators and multiply denominators. (Go straight across!)**Another option is to break the numbers into FACTORS, then CANCEL any factor that is in the numerator and denominator.*

Consider this:What is half of $\frac{4}{7}$?

$$\frac{1}{2} \cdot \frac{4}{7} =$$

What is $\frac{4}{7}$ divided by 2?So, $\frac{4}{7} \div \frac{2}{1}$ is the same thing as $\frac{4}{7} \cdot \frac{1}{2}$!

To divide fractions, rewrite the problem as **multiplying by the reciprocal**.

- Keep the first fraction
- Flip the second fraction
- Multiply!

EXAMPLE 4 Dividing Fractions

Find each quotient and write it in lowest terms.

a) $\frac{3}{4} \div \frac{8}{5}$

b) $\frac{5}{6} \div 30$

c) $\frac{2}{7} \div \frac{8}{9}$

Now consider this one:

Your take-out pizzas are cut in 8 slices. Everyone eats what they want and you are putting leftovers away. There are 3 slices left of pepperoni and 4 slices left of cheese pizza. What fraction of a whole pizza remains?

EXAMPLE 5 Adding Fractions with the Same Denominator

Find each sum, and write it in lowest terms.

(a) $\frac{3}{7} + \frac{2}{7}$

(b) $\frac{2}{10} + \frac{3}{10}$

To add fractions with the same denominator:

- **Keep the denominator**
(treat it as the “size” of the pieces)
- **Add the numerators** (how many pieces total of that size)

EXAMPLE 6 Adding Fractions with Different Denominators

Find a common denominator and build one or more fractions bigger so that you can add them:

(a) $\frac{4}{15} + \frac{5}{9}$

Least Common Denominator (LCD):

Steps:

- 1) Find the LCD
- 2) Multiply numerator & denominator by the same thing to build one (or more) fraction(s) bigger so you have the same denominator in all fractions.
- 3) Keep the denominator and add the numerators.
- 4) Write your answer in lowest terms. (Simplify)

c) $\frac{3}{7} + \frac{1}{14}$

EXAMPLE 7 Subtracting Fractions

Find each difference, and write it in lowest terms.

(a) $\frac{15}{8} - \frac{3}{8}$

(b) $\frac{7}{18} - \frac{4}{15}$

c) $\frac{7}{9} - \frac{1}{3} + \frac{1}{9}$

One last thing to consider:

Your take-out pizzas are cut in 8 slices. You are gathering up leftovers after dinner.

There are 5 slices left of pepperoni, and 6 slices left of cheese pizza. What fraction of a whole pizza remains?

Example 8: Working with Mixed Numbers

Change mixed numbers to improper fractions when it helps:

(a) $5\frac{1}{4} =$

(b) $3\frac{1}{2} + 2\frac{3}{4}$

(c) $2\frac{1}{3} \cdot 5\frac{1}{4}$

(d) $3\frac{3}{4} \div 4\frac{2}{5}$

(e) A board is $10\frac{1}{2}$ feet long. If it must be sectioned off into four pieces of equal length for shelves, how long must each piece be?

1.2 Exponents and Order of Operations

EXAMPLE 1 Evaluating Exponential Expressions

Find the value of each exponential expression.

(a) 5^2

(b) 6^3

(c) 2^5

(d) $\left(\frac{2}{3}\right)^3$

(e) $(0.3)^2$

Order of Operations:

P Parentheses ()

E Exponents

MD Multiply or Divide (either can be 1st – go left → right!)

AS Add or Subtract (either can be 1st – go left → right!)

EXAMPLE 2 Using the Rules for Order of Operations

Find the value of each expression.

a) $4 + 5 \cdot 6$

b) $9(7 + 6)$

c) $6 \cdot 8 + 24 \div 2$

d) $2(5 + 6) + 7 \cdot 3$

e) $6 + \frac{3}{4} \div \frac{1}{4}$

f) $6 \cdot 12 \div 3 + 4 \cdot 2^3 - 3^3$

Now you try!

g) $18.3 - 2(6.4)$

h) $6(2 + 4) - 7 \cdot 5$

i) $80 \div 10 \cdot 2 - 2^3 + 3 \cdot 4^2$

EXAMPLE 3 Using Brackets and Fraction Bars as Grouping Symbols

Simplify each expression.

a) $2[8 + 3(6 + 5)]$

b) $\frac{4(5+3)+3}{2(3)-1}$

Now you try!

c) $7[(3^2 - 1) + 4]$

d) $\frac{9(14-4)-2}{4 + 3 \cdot 6}$

1.3 Variables, Expressions, and Equations

Objectives:

- Evaluate algebraic expressions, given values for the variables
- Translate word phrases to algebraic expressions
- Identify solutions of equations
- Identify solutions of equations from a set of numbers
- Distinguish between expressions and equations

VariableAlgebraic expression**EXAMPLE 1** Evaluating ExpressionsFind the value of each algebraic expression for $x = 5$.

a) $8x$

b) $3x^2 - 4$

EXAMPLE 2 Evaluating Expressions

Find the value of each expression for $x = 5$ and $y = 3$.

a) $2x + 7y$

b) $\frac{9x-8y}{2x-y}$

c) $x^2 - 2y^2$

EXAMPLE 4 Deciding Whether a Number Is a Solution of an Equation

Decide whether the given number is a solution of the equation.

(a) $5p + 1 = 36$; 7

(b) $9m - 6 = 32$; 4

c) $4x - 3 = 8$; $\frac{11}{4}$

EXAMPLE 5 Finding a Solution from a Given Set

Write each word statement as an equation. Use x as the variable. Then find all solutions of the equation from the set

$$\{0, 2, 4, 6, 8, 10\}.$$

(a) The sum of a number and four is six.

(b) Nine more than five times a number is 49.

(c) The sum of a number and 12 is equal to four times the number.

EXAMPLE 6 Distinguishing between Equations and Expressions

Decide whether each of the following is an *equation* or an *expression*.

a) $2x - 5y$

b) $2x = 5y$

c) $2x + 5 = 6$

d) $2x + 5 - 6$

1.4 Real Numbers and the Number Line

EXAMPLE 1 Using Negative Numbers in Applications

Use an integer to express the number in boldface italics in each application.

(a) The lowest Fahrenheit temperature ever recorded was ***129°*** below zero at Vostok, Antarctica, on July 21, 1983. (*Source: World Almanac and Book of Facts.*)

(b) General Motors had a loss of about ***\$31*** billion in 2008. (*Source: The Wall Street Journal.*)

Natural Numbers:

Whole Numbers:

Integers:

Rational Numbers:

Irrational Numbers:

Real Numbers:

EXAMPLE 2 Determining Whether a Number Belongs to a Set

List the numbers in the following set that belong to each set of numbers.

$$\left\{-5, -\frac{2}{3}, 0, 0.\overline{6}, \sqrt{2}, 3\frac{1}{4}, 5, 5.8\right\}$$

(a) Natural numbers:

(b) Whole numbers:

(c) Integers:

(d) Rational numbers:

(e) Irrational numbers:

(f) Real numbers:

EXAMPLE 3 Determining the Order of Real Numbers

a) Is the statement $-3 < -1$ true or false?

b) True or false? $-5 > -4$

Absolute Value:

Distance from zero

**EXAMPLE 4** Finding the Absolute Value

Simplify by finding the absolute value.

a) $|0|$

b) $|-6|$

c) $|7|$

d) $-|5|$

e) $-|-5|$

f) $|8 - 2|$

g) $-|8 - 2|$

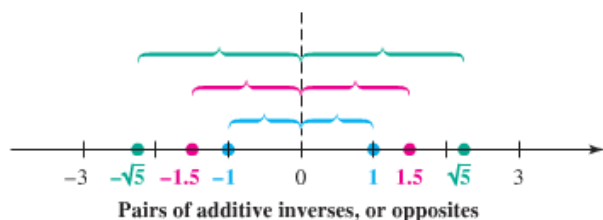
Additive Inverses (Opposite):

FIGURE 11

What is the additive inverse of -9?

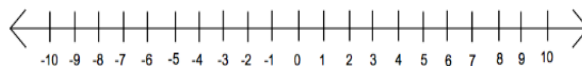
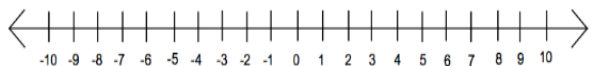
What is the additive inverse of 2.4?

1.5 Adding and Subtracting Real Numbers**EXAMPLE 1** Adding Numbers on a Number Line

Use a number line to find each sum.

(a) $2 + 3$

(b) $-2 + (-4)$



(c) $3 + 5$

(d) $-1 + (-3)$

**Adding numbers with the same sign****EXAMPLE 2** Adding Two Negative Numbers

Find each sum.

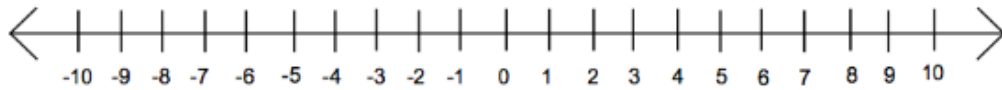
(a) $-2 + (-9)$

(b) $-8 + (-12)$

(c) $-15 + (-3)$

EXAMPLE 3 Adding Numbers with Different Signs

Use a number line to find the sum $-2 + 5$.



Use the number line to find the sum: $4 + (-8)$

**Adding numbers with different signs****EXAMPLE 4** Adding Numbers with Different Signs

Find the sum $-12 + 5$.

EXAMPLE 5 Adding Mentally

Check each answer by adding mentally. If necessary, use a number line.

(a) $7 + (-4)$

(b) $-8 + 12$

(c) $-\frac{1}{2} + \frac{1}{8}$

d) $-16 + 16$

e) $\frac{3}{4} + -\frac{7}{4} + \frac{5}{4}$

EXAMPLE 6 Using the Definition of Subtraction**Subtraction is the same as “adding the opposite”**

(a) $12 - 3$

(b) $5 - 7$

(c) $-6 - 9$

(d) $-3 - (-5)$

(e) $\frac{4}{3} - \left(-\frac{1}{2}\right)$

Uses of the Symbol $-$

We use the symbol $-$ for three purposes:

1. *to represent subtraction*, as in $9 - 5 = 4$;
2. *to represent negative numbers*, such as -10 , -2 , and -3 ;
3. *to represent the opposite (or negative) of a number*, as in “the opposite (or negative) of 8 is -8 .”

EXAMPLE 7 Adding and Subtracting with Grouping Symbols

Perform each indicated operation.

a) $-6 - [2 - (8 + 3)]$

b) $|4 - 7| + 2|6 - 3|$

You try!

e) $8 - [(-3 + 7) - (3 - 9)]$

f) $3|6 - 9| - |4 - 12|$

Word or Phrase	Example	Numerical Expression and Simplification
Sum of	The <i>sum of</i> -3 and 4	$-3 + 4$, or 1
Added to	5 <i>added to</i> -8	$-8 + 5$, or -3
More than	12 <i>more than</i> -5	$-5 + 12$, or 7
Increased by	-6 <i>increased by</i> 13	$-6 + 13$, or 7
Plus	3 <i>plus</i> 14	$3 + 14$, or 17

Word, Phrase, or Sentence	Example	Numerical Expression and Simplification
Difference between	The <i>difference between</i> -3 and -8	$-3 - (-8)$ simplifies to $-3 + 8$, or 5
Subtracted from*	12 <i>subtracted from</i> 18	$18 - 12$, or 6
From ..., subtract ...	<i>From</i> 12 , <i>subtract</i> 8 .	$12 - 8$ simplifies to $12 + (-8)$, or 4
Less	6 <i>less</i> 5	$6 - 5$, or 1
Less than*	6 <i>less than</i> 5	$5 - 6$ simplifies to $5 + (-6)$, or -1
Decreased by	9 <i>decreased by</i> -4	$9 - (-4)$ simplifies to $9 + 4$, or 13
Minus	8 <i>minus</i> 5	$8 - 5$, or 3

EXAMPLE 8 Translating Words and Phrases (Addition)

Write a numerical expression for each phrase, and simplify the expression.

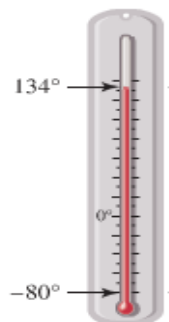
- a) The sum of -8 and 4 and 6

Write a numerical expression and then simplify.

- c) The difference between 5 and -8, decreased by 4

EXAMPLE 10 Solving a Problem Involving Subtraction

The record-high temperature in the United States is 134°F , recorded at Death Valley, California, in 1913. The record low is -80°F , at Prospect Creek, Alaska, in 1971. See **FIGURE 16**. What is the difference between these highest and lowest temperatures? (Source: *National Climatic Data Center*.)



10b) Find the difference between a gain of 226 yards on the football field by the Chesterfield Bears and a loss of 7 yards by the New London Wildcats.

1.6 Multiplying and Dividing Real Numbers

Multiplying numbers with different signs

Multiplying two negative numbers

EXAMPLE 1 Multiplying a Positive Number and a Negative Number

Find each product, using the multiplication rule given in the box.

(a) $8(-5)$ (b) $(-5)4$ (c) $-9\left(\frac{1}{3}\right)$

EXAMPLE 2 Multiplying Two Negative Numbers

(a) $-9(-2)$ (b) $-6(-12)$ (c) $-8(-1)$

EXAMPLE 4 Dividing Signed Numbers

Find each quotient.

(a) $\frac{8}{-2}$

(b) $\frac{-100}{5}$

(c) $\frac{-1.47}{-7}$

c) $-\frac{1}{8} \div \left(-\frac{3}{4}\right)$

d) $\frac{0}{14.2}$

e) $\frac{14.2}{0}$

EXAMPLE 5 Using the Rules for Order of Operations

Perform each indicated operation.

a) $-9(2) - (-3)(2)$

b) $-5(-2 - 3)$

c) $-6 + 2(3 - 5)$

d) $\frac{5(-2) - 3(4)}{2(1 - 6)}$

e) $-4(6) - (-5)(12)$

EXAMPLE 6 Evaluating Expressions for Numerical ValuesEvaluate each expression for $x = -1$, $y = -2$, and $m = -3$.

a) $(3x + 4y)(-2m)$

b) $2x^2 - 3y^2$

c) $\frac{4y^2 + x}{m}$