Algebra I
Section 1-1
Variables and Expressions

Students will be able to:
- -deepen understanding of variables and algebraic expressions.
- -put algebraic expressions into symbols
- -write a rule to describe a pattern

Area of Colorado

Flight time from San Francisco to Philadelphia

Population of Florida

Which of these has a value that varies? Explain.

Define:

mathematical quantity — an amount

variable — letter that represents an unknown

algebraic expression — Knowns + unknowns as an expression

numberical expression

Contains

What is the word phrase for the following?

$10x + 9$ — the product of a # and 10 increased by 9

$n/3$ — quotient of a # and 3

$2(x + 8)$ — two times the quantity of the sum of a # and 8

You write **(5-2) / n** to represent the phrase 2 less than 5 divided by a number n. You friend writes **(5/n) - 2**. Are these both reasonable interpretations? Can verbal descriptions lack precision?

Algebra I
Section 1-2
Order of Operations and Evaluating Expressions.

Students will be able to:
- -simplify expressions involving exponents
- -use the order of operations to evaluate expressions

To simplify something is to put it in its single numerical value.

Simplify:

1. 3^4
2. $(\frac{2}{3})^3$ $\quad \frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3} = \frac{8}{27}$
3. $(.5)^3$ $\quad \frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2} = \frac{1}{8}$

Order of Operations:

1. Start from innermost grouping symbols

   20 $\quad \cancel{6+14}$ $\quad$ 2

   $3\cdot(6+7\cdot(4-2))$ $\quad$ 60
2. Simplify powers
3. Multiply and Divide from left to right
4. Add and Subtract from left to right

Simplify the following:

1. $(9 - 3)^2 \div 4$

2. $2^5 + (11 + 14) \div 5$

3. $5 \cdot 7 - 4^2 \div 2$

16

$35 - 8 = 27$

4. $\frac{(4 + 3^4)}{(7 - 2)}$

How does a fraction bar act as a grouping symbol?

When two or more variables or variables and numbers are written together, treat them as if they were within a parenthesis.

What is the value of each expression if x = 3 and y = 4?

1. $x^2 + 2x + 16 \div y^2$

$3^2 + 2(3) + 16 \div 4^2$

$9 + (6) + (16 \div 16)$

1

16

2. $(x + y)^2$

Algebra I
Section 1-3

Students will be able to:
- -classify, graph and compare real numbers
- -find and estimate square roots

Define

Square Root:

$\sqrt{4}$ $\sqrt{17}$

Perfect Squares:

Come out even

Examples of perfect squares:

$\sqrt{25}$ $\sqrt{4}$ $\sqrt{16}$

radical symbol $\sqrt{}$ $\mathbf{X}$ radicand

Simplify:

$\sqrt{64}$

$\sqrt{\frac{25}{36}} = \frac{5}{6}$

$\sqrt{\frac{1}{121}} = \frac{1}{11}$

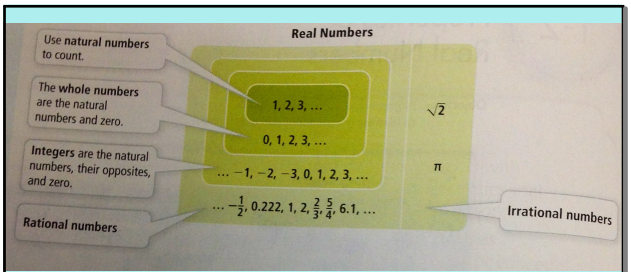
Estimating a Square Root:

$\sqrt{220} = 14.7$

14 196

15 225

Check:



Rational #s:
-can be written as a quotient of integers
-include terminating decimals
-include repeating decimals

Irrational #s:
-have decimals that don't terminate or repeat
-cannot be written as quotients of integers

When you classify variables, you name the subset that gives you the most information.

Rational or Irrational?

$.252\overline{525}$

1.78

-54

$\sqrt{23}$

To which subsets (classification) does each number belong?

12

-5.01479 rational #

$\sqrt{21}$

0 → whole, integ, rat.

$>$

$x < 5$

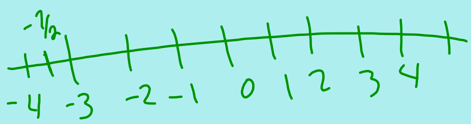
$10 \geq 2$

$\leq$

Order the following on a number line:

$-\frac{7}{2}$, 3.5, $\sqrt{5}$, -2.1, $\sqrt{9}$

-3.5 2.23 3



Section 1 - 4

Properties of Real Numbers

Students will be able to:
-identify and use properties of real numbers

True of False????

$34 + 12 = 12 + 34$

$100 - 1 = 1 - 100$

$0 + 180 = 180$

$18 \div \frac{1}{18} = 1$

$45 - 1 = 45$

$6 \times \frac{1}{6} = 1$

Relationships that are always true for real numbers are called **properties**.

They are used to rewrite and compare expressions.

How would you define **equivalent expressions?**

2 quantities that are equal

Commutative Property of Addition order $a+b=b+a$	Commutative Property of Multiplication $ab=ba$
Associative Property of Addition regroup $a+(b+c)=(a+b)+c$	Associative Property of Multiplication $a(bc)=(ab)c$
Identity Property of Addition $a+0=a$	Identity Property of Multiplication $a \cdot 1=a$

Which Property is illustrated?

1. $51.3x \bullet 0 = 0$
2. $x + (y + z) = x + (z + y)$ Commut.
3. $(35 \bullet 2) \bullet 5 = 35 \bullet (2 \bullet 5)$ assoc.

#3 is an example of how we can use these properties to help with mental math.

Use mental math to figure out how much it would cost at the movies to buy a ticket for \$6.75, a drink for \$1.90 and popcorn that cost \$2.25.

A can holds 3 tennis balls. A box holds 4 cans. A case holds 5 boxes. How many tennis balls are in 10 cases? Use mental math.

Simplify each expression and justify each step.

$6 + (4h + 3)$

This process of using the properties to show two expressions are equivalent is called **deductive reasoning**.

To show that a statement is not true, you can find one example or instance in which it is not true. This is finding a **counterexample.**

Find a counterexample to prove the following are not true.

1. Every left-handed person plays golf with left-hand clubs.

2. Every meal at McDonalds is under $7.00.

Hwk: pg. 8 #28-32 evens, 33, 34

pg. 14-15 # 36-42 evens, 46, 52, 53

pg. 20-21 #24, 34-36 all, 38, 50-55 all

pg. 27 #22, 32, 34, 36, 42, 43, 45

Attachments

Sec1.1.notebook

Sec1.2.notebook

Sec1.3.notebook

Sec1.4.notebook

NumberSystem.galleryitem