Math 71
Chapter 1 Notes

Order of Operations:

Parenthesis and Exponents
Multiplication and Division
Addition and Subtraction

Properties:

Commutative Property of Addition

$$a+b=b+a$$

Commutative Property of Multiplication

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

Associative Property of Addition

$$a+(b+c)=(a+b)+c$$

Associative Property of Multiplication

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

Distributive Property

$$a(b+c)=ab+ac$$

Identity Property of Addition

$$a+0=0+a=a$$

Identity Property of Multiplication

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

Inverse Property of Addition

$$a+(-a)=0$$

Inverse Property of Multiplication

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

Like Terms are terms that have exactly the same variable factors.

A **linear equation** in one variable x is an equation that can be written

$$ax+b=0$$

where a and b are real numbers, and $a \neq 0$.

An equation that is true for all real numbers for which both sides are defined is called an **identity.**

A conditional equation is an equation that is not an identity, but that is true for at least one real number.

An **inconsistent equation**, also called a contradiction, is an equation that is not true for even one real number.

Strategy for Solving Word Problems

1. Read the problem carefully. Attempt to state the problem in your own words and state what the problem is looking for. Let x represent one of the quantities in the problem.
2. If necessary, write expressions for any other unknown quantities in terms of x.
3. Write an equation in x that describes the verbal conditions of the problem.
4. Solve the equation and answer the problem's question in a complete sentence.
5. Make sure your answer makes sense.

Exponent Rules

b^n where b is the base and n is the exponent

$b^n = b \cdot b \cdot b \cdot b \cdot \ldots \cdot b$ n times

$b^n \cdot b^m = b^{n+m}$

$\frac{b^n}{b^m} = b^{n-m}, b \neq 0$

$\left(b^n\right)^m = b^{n \cdot m}$

$b^0 = 1, b \neq 0$

$b^{-n} = \frac{1}{b^n}, b \neq 0$

$(ab)^n = a^n \cdot b^n$

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$

Examples:

Solve and check each linear equation.

$2(x-4)+3(x+5)=2x-2$

$2x-4(5x+1)=3x+17-1$

$\frac{3x+1}{3}-\frac{13}{2}=\frac{1-x}{4}$

$$7x + 5 = 5(x + 3) + 2x$$

$$7x + 13 = 3x - 10 + 2x + 23$$

$$(2x - 3)2 - 3(x + 1) = (x - 2)4 - 3(x + 5)$$

$$4(x - 3) + 5 = x + 5(x - 2)$$

Simplify each exponential expression. Assume that no denominators are zero. Leave no negative exponents in your answers.

$$(-3x^7)(-5x^6)$$

$$\left(\frac{3xy^3}{5x^{=3}y^{-4}}\right)^2$$

$$(3x^4y^{-2})(-2x^5y^{-3})$$

$$2^{-2}+\frac{1}{2}x^0$$

$$\frac{12x^7}{4x^{-3}}$$

Find two numbers such that the second number is 3 more than twice the first number and the sum of the two numbers is 72.

The length of a rectangular field exceeds the width by 260 yards. If the perimeter is 1000 yards, what are the dimensions?

After a 60% reduction, a jacket sold for $20. What was the jacket's price before the reduction?