



Chapter 6: Algebra, Graphs, & Functions

Math 120

Math for General Education

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Section 6.1

Order of Operations

◆ PEMDAS

- ◆ "Please Excuse My Dear Aunt Sally"
- ◆ Parentheses
- ◆ Exponents
- ◆ Multiplication – (L to R)
- ◆ Division
- ◆ Addition – (L to R)
- ◆ Subtraction

- 
- o Variables – letters of the alphabet that represent numbers
 - o Constant – A symbol that represents a specific quantity

Evaluate

$$8 + 16 \div 4$$

$$8 + 4$$

$$12$$

$$-7x + 4, \text{ for } x = -2$$

$$5x^2 + 7x - 11, \text{ for } x = -1$$

$$4x^2 - 12xy + 9y^2, \text{ for } x = 3 \text{ \& } y = 2$$

Evaluate

$$2x^2 - x - 5 = 0$$

Is $x = 3$ a solution?

$$2(9) - 3 - 5 = 0$$

$$18 - 8 = 0$$

$$10 = 0$$

$$y = x^2 + 3x - 5, \text{ for } x = 1 \text{ \& } y = -1$$

$$-1 = 1 * 1 + 3 - 5$$

$$-1 = 4 - 5 = -1$$

Yes

Evaluate

$$y = x^3 - 3x^2 + 1 \text{ for } x = 2, y = -3$$

$$-3 = 8 - 12 + 1 \quad \text{Yes}$$

Practice Problems

◆ Practice Problems

- Pages 315-316
 - ◆ #9-45

Section 6.2

Linear Equations in One Variable

$$x + 3 = 4$$

Simple equation, can solve easily

$$2x - 3 = 4(x + 3) \text{ more complex}$$

- requires understanding of like terms & 4 basic properties

Like Terms

$$2x, 7x$$

$$-8y, 3y$$

$$-4, 10$$

$$-5x^2, 6x^2$$

Unlike Terms

$$2x, 9$$

$$5x, 6y$$

$$x, 8$$

$$2x^3, 3x^2$$

To simplify means to combine like terms

Properties of Real Numbers

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

Distributive Property

$$a + b = b + a$$

Commutative Property of Addition

$$ab = ba$$

Commutative Property of Multiplication

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

Associative Property of Addition

$$(ab)c = a(bc)$$

Associative Property of Multiplication

Simplify:

$$-2x + 4 - 6y - 11 - 5y + 3x$$

$$-2x + 3x - 6y - 5y + 4 - 11$$

$$x - 11y - 7$$

Solving Linear Equations

Linear equation – exponent on variable is 1

$$5x - 1 = 3 \quad \text{linear?}$$

$$x^2 + x + 1 = 0 \quad \text{linear?}$$

exponent on variable x is 2

- To solve a linear equation, we have to isolate the variable.

=> variables on 1 side, constants on other side of =

Solving Linear Equations (cont.)

Use 4 properties of equality

1. Addition Property of Equality
if $a = b$, then $a + c = b + c$ a, b, c are reals
2. Subtraction Property of Equality
if $a = b$, then $a - c = b - c$ a, b, c are reals
3. Multiplication Property of Equality
If $a = b$, then $ac = bc$ a, b, c , are reals
and $c \neq 0$
4. Division Property of Equality
if $a = b$, then $a/c = b/c$ a, b, c , are reals
and $c \neq 0$

General Procedure for Solving Linear Equations

1. If the equation contains fractions, multiply both sides by the LCD (or LCM) to eliminate all fractions.
2. Use the distributive property to remove parentheses when necessary.
3. Combine like terms on the same side of the equal sign when possible.
4. Use the addition or subtraction property to collect all terms with a variable on one side of the equal sign and all constants on the other side. This will eventually result in an equation of the form $ax = b$ (a & b reals).
5. Solve for the variable using the division or multiplication property. This will result in an answer in the form $x = c$, where c is a real number.

Proportions

- ◆ A ***ratio*** is a quotient of two quantities.
- ◆ A ***proportion*** is a statement of equality between two ratios.

Practice Problems

◆ In-Class Problems

- Pages 232-233
 - ◆ #28, 45, 62, 65, 66
- Pages 327-329
 - ◆ #15-74