

# Algebra 2 - 1<sup>st</sup> Semester Notes Practice

## Chapter 1: Tools of Algebra

### 1.2 Algebraic Expressions

1)  $7a - 2c^2 - 4$ ;  $a = 2$  and  $c = -3$

2)  $5 - 2(6x - 2y) + 2$ ;  $x = 3$  and  $y = -2$

Combine Like Terms

3)  $7x - 5x + 2 - x + 5y - 3$

4)  $4x^2 - 5x(7 - x) + 9x$

### 1.3 Solving Equations

1)  $3 - 6k = 8 + 7k$

2)  $-3(4n - 1) = -11$

3)  $x - 7x + 2 = 5(9 - x)$

4)  $\frac{3}{4}x - \frac{5}{6} = 1$

5)  $0.2 - 9.5x = -1.6 - 6.3x$

### 1.4 Solving Inequalities

1)  $-5 \geq 16 - 3x$

2)  $9x - 8 < 7x + 10$

### 1.5 Absolute Value Equations and Inequalities

1)  $|3x + 5| = 7$

2)  $|3 - x| + 8 = 1$

3)  $-2|7 + 3x| + 4 = -18$

4)  $|3x - 1| < 10$

5)  $3|2 - 5x| + 1 > 22$

### 1.6 Probability

8 red, 2 yellow, 10 green

1) P(yellow)

2) P(not green)

3) P(red or yellow)

Rolling a die.

4) P(odd)

5) P(2 or 6)

6) P(greater than 4)

## Chapter 2: Functions, Equations, and Graphs

### 2.1 Relations and Functions

$f(x) = 10 - 2x$ ,  $g(x) = 2x - 3x^2$ ,  $h(x) = \frac{2}{5}x - 3$     1)  $f(-3)$     2)  $h(3)$     3)  $g(2)$     4)  $f\left(\frac{5}{3}\right)$

### 2.2 Linear Equations

Graph: 1)  $y = 5 - 2x$

2)  $5x - 3y = 6$

3)  $y = 4$  &  $x = -3$

Find Slope: 4)  $(-2, 7)$  and  $(5, -1)$

5)  $(-3, 5)$  and  $(3, -4)$

### 2.7 Two-Variable Inequalities

Graph: 1)  $y > -3x$

2)  $2x - 3y \geq -6$

3)  $x < 4$

4)  $y \geq -2$

## Chapter 3: Linear Systems

### 3.1 Graphing Systems of Equations

Find Solution to System by Graphing: 1)  $\begin{cases} y = 3 - x \\ y = \frac{1}{3}x - 1 \end{cases}$     2)  $\begin{cases} y = x + 1 \\ x - y = 1 \end{cases}$     3)  $\begin{cases} 5y - 4x - 6 = 0 \\ 4x - 5y - 6 = 0 \end{cases}$

### 3.2 Solving Systems Algebraically

Solve by Substitution Method: 1)  $\begin{cases} y = 5 + x \\ 2x - 2y = 5 \end{cases}$     2)  $\begin{cases} 2x - y = -1 \\ 10x = 2y - 8 \end{cases}$

Solve by Elimination Method: 3)  $\begin{cases} 5y - 3x = -6 \\ y + 3x = 24 \end{cases}$     4)  $\begin{cases} -2x + y = 10 \\ 3y - 6x = 30 \end{cases}$     5)  $\begin{cases} 10x + 6y = 0 \\ -7x + 2y - 31 = 0 \end{cases}$

6) Joe is making \$10 an hour and he owes \$25. Kim is making \$8 an hour and has \$25 saved. When will they have the same amount of money and how much will they have?

7) You sell 24 items and made \$80. CDs \$2 and DVDs \$4. How many CDs and DVDs did you sell?

### 3.3 Systems of Inequalities

1)  $\begin{cases} y < x \\ x > 2 \end{cases}$     2)  $\begin{cases} y < 3 \\ 2x - y \leq 3 \end{cases}$     3)  $\begin{cases} x < 2 \\ y \leq 2x - 1 \\ y > -3 \end{cases}$

### 3.6 Systems with Three Variables

$$1) \begin{cases} 2x + y - z = 5 \\ x + 4y + 2z = 16 \\ 15x + 6y - 2z = 12 \end{cases}$$

$$2) \begin{cases} 12x + 7y + 5z = 16 \\ -2x + y - 14z = -9 \\ -3x - 2y + 9z = -12 \end{cases}$$

## Chapter 5: Quadratic Equations and Functions

### 5.2 Properties of Parabolas

1) Graph:  $y = -x^2 + 6x + 1$

2) Graph:  $y = 2x^2 - 5$

### 5.3 Transforming Parabolas

1) Graph:  $y = 2(x-3)^2 - 5$

2) Graph:  $y = -4(x+1)^2 + 3$

### 5.4 Factoring Quadratic Expressions

1)  $x^2 - 12x + 8$

2)  $3x^2 - 13x + 10$

3)  $49x^2 + 42x + 36$

4)  $x^2 - 121$

5)  $144x^2 - 25$

6)  $-3x^3 + 27x$

7)  $5x^2 - 20x - 25$

### 5.5 Quadratic Equations

1)  $\sqrt{270}$

2)  $\sqrt{160}$

3)  $x^2 - 36 = 0$

4)  $x^2 - x = x + 24$

5)  $3x^2 + 33x = 12x$

6)  $4(5-2x)(3x-1) = 0$

7)  $121x^2 = 81$

8)  $x^2 - 4 = 28$

### 5.6 Complex Numbers

1)  $\sqrt{-49}$

2)  $\sqrt{-63}$

3)  $(-3-7i) - (-9+i)$

4)  $(-3+2i)(5+8i)$

5)  $(10i)^2$

6)  $\frac{7}{8i}$

7)  $\frac{3+6i}{5-3i}$

8)  $x^2 + 16 = 4$

9) Plot: A)  $-2+3i$  B)  $-2i$

### 5.7 Completing the Square

1)  $(x-3)^2 = 16$

2)  $x^2 - 12x = 3$

3)  $x^2 + 6x - 2 = 1$

### 5.8 Quadratic Formula

1)  $x^2 - 7x + 5 = 0$

2)  $2x^2 - 4x = 7 - x$

## Chapters 6: Polynomials

### 6.1 Polynomial Functions

1)  $(-3x^2 + 3x) - (x^2 + 8x - 1)$

2)  $(x^3 - x^2 + 7x) - (2x^2 - 1) + (3x^3 - 2)$

3)  $4x^2(2x^3 - 8x)$

4)  $(5x^2 - 2)(3 - 2x)$

5)  $(3x - 5)(x^2 - 2x + 1)$

6)  $(3x - 2)^3$

### 6.3 Dividing Polynomials

1)  $(x^2 - 7x + 3) \div (x - 4)$

2)  $(2x^3 - 3x^2 + 5) \div (x + 2)$

### 6.4 Factoring Polynomials

1)  $x^3 + 216$

2)  $27x^4 - x$

3)  $125x^3 - 8$

### 6.7 Permutations and Combinations

1)  $\frac{6!}{2!3!}$

2)  ${}_6P_3$

3)  ${}_7C_5$

4)  ${}_5P_3 - {}_4C_2$

5) Ways to get 1<sup>st</sup> and 2<sup>nd</sup> from 5 contestants:

6) Ways to order 3 letter from the word **HOME**:

7) Ways to choose 5 out of 6 people:

8) Amigos has 4 meats and 7 fillings to choose from. How many different burritos can you make that have 2 fillings?

**6.8 Binomial Theorem**

1)  $(2x^3 + 3y)^4$

2) 4<sup>th</sup> term of  $(2x - 3)^7$

9) Pizza Hut has 3 meats and 6 veggies to choose from. How many different pizzas could you make with at most 4 items?

**Chapter 7: Functions**

**7.6 Function Operations**

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| $f(x) = 2 - 4x$ | $g(x) = 3x^2 + x$ | $h(x) = 3x + 5$ |
|-----------------|-------------------|-----------------|

1)  $f(x) - h(x)$

2)  $h(x) \cdot g(x)$

3)  $\frac{g(x)}{f(x)}$

4)  $f(g(x))$

5)  $(g \circ h)(x)$

6)  $h(-1) - g(5)$

7)  $(f \circ g)(3)$

8)  $g(h(-4))$

9)  $2h(x) - g(x) + 8$

**7.7 Inverse Functions**

1)  $f(x) = 8 - 3x$  Find:  $f^{-1}(x)$

2)  $g(x) = 5x - 7$  Find:  $g^{-1}(x)$