POSNACK SCHOOL

Algebra 2 Summer Assignment

Dear Parents/Students,

In the summer time, many necessary mathematical skills are lost due to the absence of daily exposure. The loss of skills may result in a lack of success and unnecessary frustration for students as they begin the new school year. The purpose of this math assignment is to set the stage for instruction for the 2018-2019 school year. Packets are to be downloaded, printed out, and worked on neatly in the packet or on a separate piece of paper. Additionally, students should attempt all problems without calculators. The completed packet is due on the first day of school during math class and will be worth 30 points.

The packet is a review of previously taught concepts. Each concept includes a quick review and practice. Some might even include review videos students can access. Additional help can be found at www.khanacademy.org. These skills are required to be successful in the upcoming year. We will be briefly reviewing this information on the first day of school, and then moving into the class curriculum.

Thank you,

The High School Math Team

Algebra II Summer Packet

A. Simplifying Polynomial Expressions

Objectives: The student will be able to:

- Apply the appropriate arithmetic operations and algebraic properties needed to simplify an algebraic expression.
- Simplify polynomial expressions using addition and subtraction.
- Multiply a monomial and polynomial.

B. Solving Equations

Objectives: The student will be able to:

- Solve multi-step equations.
- Solve a literal equation for a specific variable, and use formulas to solve problems.

C. Rules of Exponents

Objectives: The student will be able to:

- Simplify expressions using the laws of exponents.
- Evaluate powers that have zero or negative exponents.

D. Binomial Multiplication

Objectives: The student will be able to:

- Multiply two binomials.

E. Factoring

Objectives: The student will be able to:

- Identify the greatest common factor of the terms of a polynomial expression.
- Express a polynomial as a product of a monomial and a polynomial.
- Find all factors of the quadratic expression $ax^2 + bx + c$ by factoring and graphing.

F. Radicals

Objectives: The student will be able to:

- Simplify radical expressions.

G. Graphing Lines

Objectives: The student will be able to:

- Identify and calculate the slope of a line.
- Graph linear equations using a variety of methods.
- Determine the equation of a line.

H. Algebra Basics

Objectives: The student will be able to:

- Calculate values using fractions and integers.
- Complete fraction word problems.

A. Simplifying Polynomial Expressions

I. Combining Like Terms

- You can add or subtract terms that are considered "like", or terms that have the same variable(s) with the same exponent(s).

Ex. 1: 5x - 7y + 10x + 3y

5x - 7y + 10x + 3y

15x - 4y

Ex. 2: $-8h^2 + 10h^3 - 12h^2 - 15h^3$

$-8h^2 + 10h^3 - 12h^2 - 15h^3$

$-20h^2 - 5h^3$

II. Applying the Distributive Property

- Every term inside the parentheses is multiplied by the term outside of the parentheses.

Ex. 1: $3(9x-4)$

$3\cdot 9x - 3\cdot 4$

$27x - 12$

Ex. 2: $4x^2(5x^3+6x)$

$4x^2\cdot 5x^3 + 4x^2\cdot 6x$

$20x^5 + 24x^3$

III. Combining Like Terms AND the Distributive Property (Problems with a Mix!)

- Sometimes problems will require you to distribute AND combine like terms!!

Ex. 1: $3(4x-2)+13x$

$3\cdot 4x - 3\cdot 2 + 13x$

$12x - 6 + 13x$

$25x - 6$

Ex. 2: $3(12x-5)-9(-7+10x)$

$3\cdot 12x - 3\cdot 5 - 9(-7) - 9(10x)$

$36x - 15 + 63 - 90x$

$-54x + 48$

PRACTICE SET 1

Simplify.

1. $8x - 9y + 16x + 12y$

2. $14y + 22 - 15y^2 + 23y$

3. $5n - (3 - 4n)$

4. $-2(11b - 3)$

5. $10q(16x + 11)$

6. $-(5x - 6)$

7. $3(18z - 4w) + 2(10z - 6w)$

8. $(8c + 3) + 12(4c - 10)$

9. $9(6x - 2) - 3(9x^2 - 3)$

10. $-(y - x) + 6(5x + 7)$

B. Solving Equations

I. Solving Two-Step Equations

A couple of hints:

1. To solve an equation, UNDO the order of operations and work in the reverse order.
2. REMEMBER! Addition is "undone" by subtraction, and vice versa. Multiplication is "undone" by division, and vice versa.

$$Ex. 1: \; 4x - 2 = 30$$
$$+2 \quad +2$$
$$4x = 32$$
$$\div 4 \quad \div 4$$
$$x = 8$$

$$Ex. 2: \; 87 = -11x + 21$$
$$-21 \qquad -21$$
$$66 = -11x$$
$$\div -11 \quad \div -11$$
$$-6 = x$$

II. Solving Multi-step Equations With Variables on Both Sides of the Equal Sign

- When solving equations with variables on both sides of the equal sign, be sure to get all terms with variables on one side and all the terms without variables on the other side.

$$Ex. 3: \; 8x + 4 = 4x + 28$$
$$-4 \qquad -4$$
$$8x = 4x + 24$$
$$-4x \quad -4x$$
$$4x = 24$$
$$\div 4 \quad \div 4$$
$$x = 6$$

III. Solving Equations that need to be simplified first

- In some equations, you will need to combine like terms and/or use the distributive property to simplify each side of the equation, and then begin to solve it.

$$Ex. 4: \; 5(4x - 7) = 8x + 45 + 2x$$
$$20x - 35 = 10x + 45$$
$$-10x \qquad -10x$$
$$10x - 35 = 45$$
$$+35 \quad +35$$
$$10x = 80$$
$$\div 10 \quad \div 10$$
$$x = 8$$

PRACTICE SET 2

Solve each equation. You must show all work.

1. $5x - 2 = 33$

2. $140 = 4x + 36$

3. $8(3x - 4) = 196$

4. $45x - 720 + 15x = 60$

5. $132 = 4(12x - 9)$

6. $198 = 154 + 7x - 68$

7. $= 131 = = 5(3x = 8) + 6x$

8. $-7x - 10 = 18 + 3x$

9. $12x + 8 - 15 = -2(3x - 82)$

10. $= (12x = 6) = 12x + 6$

IV. Solving Literal Equations

- A literal equation is an equation that contains more than one variable.
- You can solve a literal equation for one of the variables by getting that variable by itself (isolating the specified variable).

$Ex. 1:\ 3xy = 18,\quad \text{Solve for } x.$

$$\frac{3xy}{3y} = \frac{18}{3y}$$

$$x = \frac{6}{y}$$

$Ex. 2:\ 5a - 10b = 20,\quad \text{Solve for } a.$

$$+10b \quad = +10b$$

$$5a = 20 + 10b$$

$$\frac{5a}{5} = \frac{20}{5} + \frac{10b}{5}$$

$$a = 4 + 2b$$

PRACTICE SET 3

Solve each equation for the specified variable.

1. $Y + V = W$, for V

2. $9wr = 81$, for w

3. $2d - 3f = 9$, for f

4. $dx + t = 10$, for x

5. $P = (g - 9)180$, for g

6. $4x + y - 5h = 10y + u$, for x

C. Rules of Exponents

Multiplication: Recall $(x^m)(x^n) = x^{(m+n)}$ $Ex: (3x^4y^2)(4xy^5) = (3\cdot 4)(x^4 \cdot x^1)(y^2 \cdot y^5) = 12x^5y^7$

Division: Recall $\frac{x^m}{x^n} = x^{(m-n)}$ $Ex: \frac{42m^5j^2}{-3m^3j} = \left(\frac{42}{-3}\right)\left(\frac{m^5}{m^3}\right)\left(\frac{j^2}{j^1}\right) = -14m^2j$

Powers: Recall $(x^m)^n = x^{(m\cdot n)}$ $Ex: (-2a^3bc^4)^3 = (-2)^3(a^3)^3(b^1)^3(c^4)^3 = -8a^9b^3c^{12}$

Power of Zero: Recall $x^0 = 1,\ x \neq 0$ $Ex: 5x^0y^4 = (5)(1)(y^4) = 5y^4$

<u>PRACTICE SET 4</u>

Simplify each expression.

1. $(c^5)(c)(c^2)$
2. $\frac{m^{15}}{m^3}$
3. $(k^4)^5$
4. d^0
5. $(p^4q^2)(p^7q^5)$
6. $\frac{45y^3z^{10}}{5y^3z}$
7. $(-t^7)^3$
8. $3f^3g^0$
9. $(4h^5k^3)(15k^2h^3)$
10. $\frac{12a^4b^6}{36ab^2c}$
11. $(3m^2n)^4$
12. $(12x^2y)^0$
13. $(-5a^2b)(2ab^2c)(-3b)$
14. $4x(2x^2y)^0$
15. $(3x^4y)(2y^2)^3$

D. Binomial Multiplication

I. Reviewing the Distributive Property

The distributive property is used when you want to multiply a single term by an expression.

Ex 1: $8(5x^2 - 9x)$

$8 \cdot 5x^2 + 8 \cdot (-9x)$

$40x^2 - 72x$

II. Multiplying Binomials – the FOIL method

When multiplying two binomials (an expression with two terms), we use the "FOIL" method. The "FOIL" method uses the distributive property twice!

FOIL is the order in which you will multiply your terms.

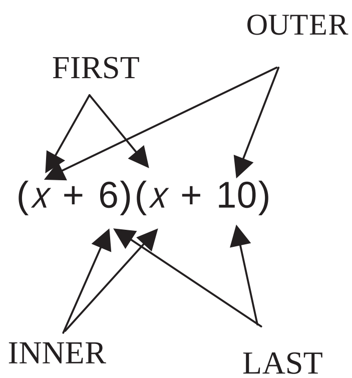
First

Outer

Inner

Last

Ex. 1: (x + 6)(x + 10)



First	$x \cdot x$ ------> x^2
Outer	$x \cdot 10$ -----> $10x$
Inner	$6 \cdot x$ ------> $6x$
Last	$6 \cdot 10$ -----> 60

$x^2 + 10x + 6x + 60$

$x^2 + 16x + 60$
(After combining like terms)

Recall: $4^2 = 4 \cdot 4$

$x^2 = x \cdot x$

Ex. $(x + 5)^2$

$(x + 5)^2 = (x + 5)(x+5)$

Now you can use the "FOIL" method to get a simplified expression.

PRACTICE SET 5

Multiply. Write your answer in simplest form.

1. $(x + 10)(x - 9)$

2. $(x + 7)(x - 12)$

3. $(x - 10)(x - 2)$

4. $(x - 8)(x + 81)$

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

6. $(-2x + 10)(-9x + 5)$

7. $(-3x - 4)(2x + 4)$

8. $(x + 10)^2$

9. $(-x + 5)^2$

10. $(2x - 3)^2$

E. Factoring

I. Using the Greatest Common Factor (GCF) to Factor.

- Always determine whether there is a greatest common factor (GCF) first.

Ex. 1 $3x^4 = 33x^3 + 90x^2$

- In this example the GCF is $3x^2$.
- So when we factor, we have $3x^2(x^2 = 11x + 30)$.
- Now we need to look at the polynomial remaining in the parentheses. Can this trinomial be factored into two binomials? In order to determine this make a list of all of the factors of 30.

30		30	
1	30	-1	-30
2	15	-2	-15
3	10	-3	-10
5	6	-5	-6

Since -5 + -6 = -11 and (-5)(-6) = 30 we should choose -5 and -6 in order to factor the expression.

- The expression factors into $3x^2(x = 5)(x = 6)$

Note: Not all expressions will have a GCF. If a trinomial expression does not have a GCF, proceed by trying to factor the trinomial into two binomials.

II. Applying the difference of squares: $a^2 = b^2 = (a = b)(a + b)$

Ex. 2 $4x^3 - 100x$

$4x(x^2 - 25)$

$4x(x - 5)(x + 5)$

Since x^2 and 25 are perfect squares separated by a subtraction sign, you can apply the difference of two squares formula.

PRACTICE SET 6

Factor each expression.

1. $3x^2 + 6x$

2. $4a^2b^2 = 16ab^3 + 8ab^2c$

3. $x^2 = 25$

4. $n^2 + 8n + 15$

5. $g^2 = 9g + 20$

6. $d^2 + 3d = 28$

7. $z^2 = 7z = 30$

8. $m^2 + 18m + 81$

9. $4y^3 = 36y$

10. $5k^2 + 30k = 135$

F. Radicals

To simplify a radical, we need to find the greatest perfect square factor of the number under the radical sign (the radicand) and then take the square root of that number.

$Ex. 1: \sqrt{72}$

$\sqrt{36} \cdot \sqrt{2}$

$6\sqrt{2}$

$Ex. 2: 4\sqrt{90}$

$4 \cdot \sqrt{9} \cdot \sqrt{10}$

$4 \cdot 3 \cdot \sqrt{10}$

$12\sqrt{10}$

$Ex. 3: \sqrt{48}$

$\sqrt{16}\sqrt{3}$

$4\sqrt{3}$

OR

$Ex. 3: \sqrt{48}$

$\sqrt{4}\sqrt{12}$

$2\sqrt{12}$ ← This is not simplified completely because 12 is divisible by 4 (another perfect square)

$2\sqrt{4}\sqrt{3}$

$2 \cdot 2 \cdot \sqrt{3}$

$4\sqrt{3}$

PRACTICE SET 7

Simplify each radical.

1. $\sqrt{121}$
2. $\sqrt{90}$
3. $\sqrt{175}$
4. $\sqrt{288}$
5. $\sqrt{486}$
6. $2\sqrt{16}$
7. $6\sqrt{500}$
8. $3\sqrt{147}$
9. $8\sqrt{475}$
10. $\sqrt{\frac{125}{9}}$

G. Graphing Lines

I. Finding the Slope of the Line that Contains each Pair of Points.

Given two points with coordinates (x_1, y_1) and (x_2, y_2), the formula for the slope, *m*, of the line containing the points is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

Ex. (2, 5) and (4, 1)

$m = \frac{1-5}{4-2} = \frac{-4}{2} = -2$

The slope is -2.

Ex. (-3, 2) and (2, 3)

$m = \frac{3-2}{2-(-3)} = \frac{1}{5}$

The slope is $\frac{1}{5}$

<u>PRACTICE SET 8</u>

1. (-1, 4) and (1, -2)

2. (3, 5) and (-3, 1)

3. (1, -3) and (-1, -2)

4. (2, -4) and (6, -4)

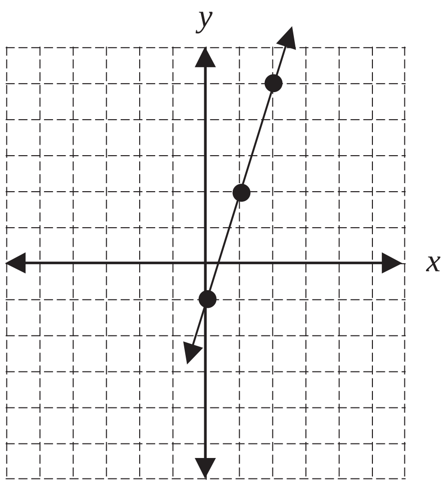
5. (2, 1) and (-2, -3)

6. (5, -2) and (5, 7)

II. Using the Slope – Intercept Form of the Equation of a Line.
The slope-intercept form for the equation of a line with slope *m* and *y*-intercept *b* is $y = mx + b$.

Ex. $y = 3x = 1$

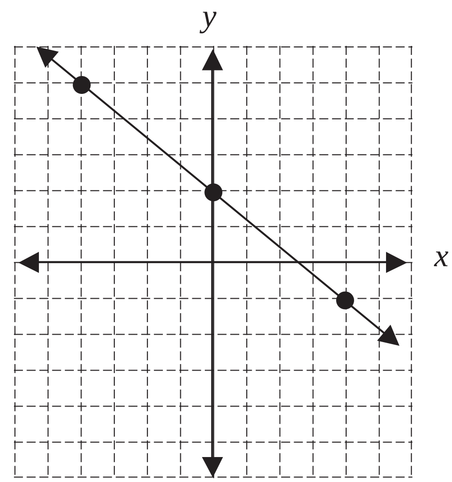
Slope: 3 *y*-intercept: -1



Place a point on the *y*-axis at -1.
Slope is 3 or 3/1, so travel up 3 on the *y*-axis and over 1 to the right.

Ex. $y = =\frac{3}{4}x + 2$

Slope: $=\frac{3}{4}$ *y*-intercept: 2

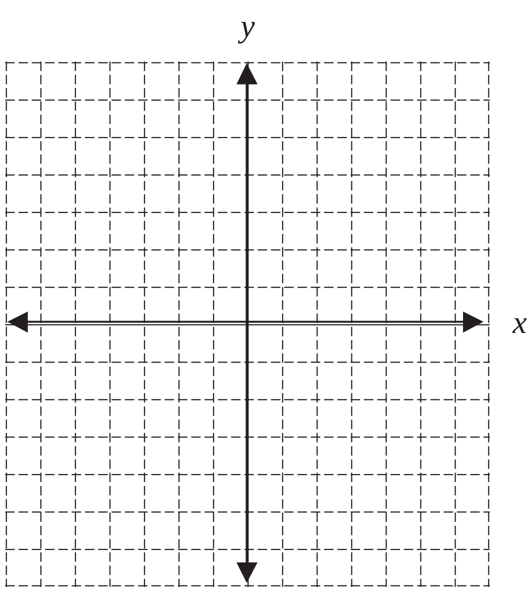


Place a point on the *y*-axis at 2.
Slope is -3/4 so travel down 3 on the *y*-axis and over 4 to the right. Or travel up 3 on the *y*-axis and over 4 to the left.

<u>PRACTICE SET 9</u>

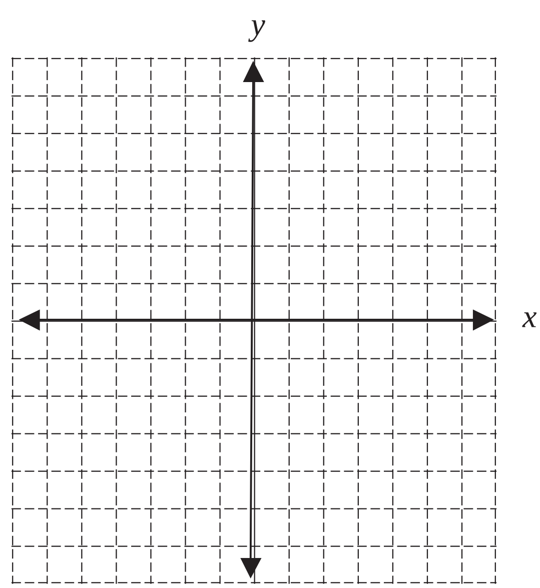
1. $y = 2x + 5$

Slope: _____ *y*-intercept: _____



2. $y = \frac{1}{2}x = 3$

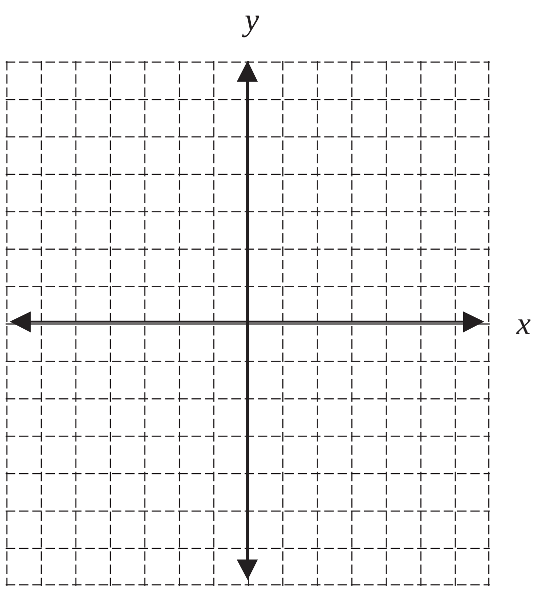
Slope: _____ *y*-intercept: _____



3. $y = = \frac{2}{5}x + 4$

Slope: ______________

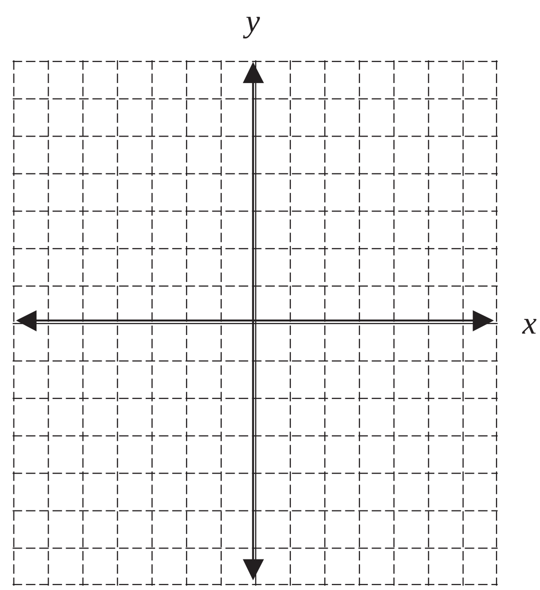
y-intercept: ______________



4. $y = =3x$

Slope: ______________

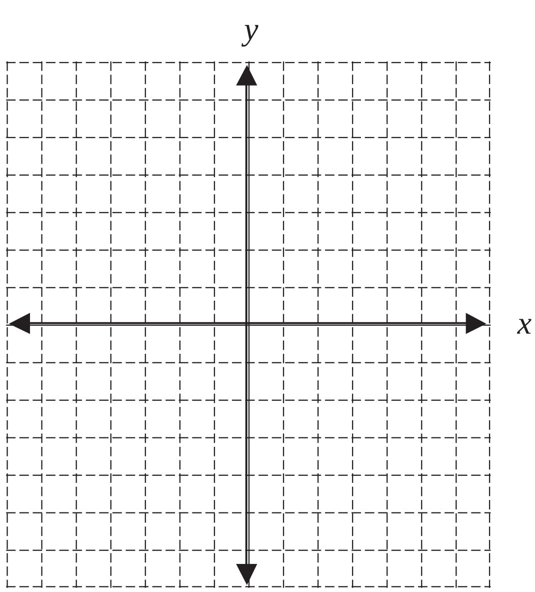
y-intercept ______________



5. $y = =x + 2$

Slope: ______________

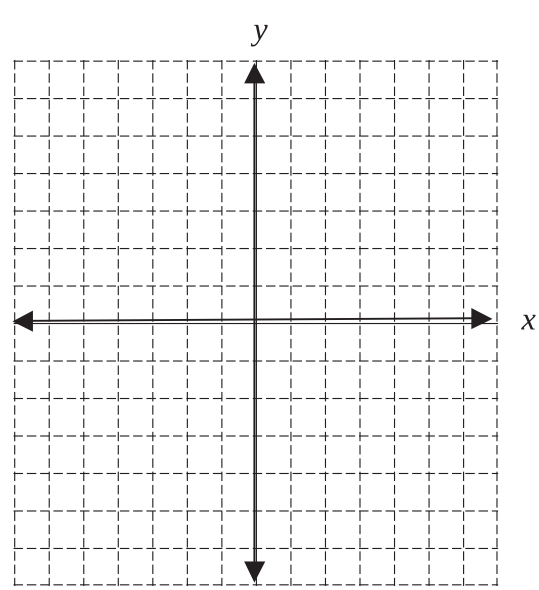
y-intercept: ______________



6. $y = x$

Slope: ______________

y-intercept ______________



III. Using Standard Form to Graph a Line.

An equation in standard form can be graphed using several different methods. Two methods are explained below.

a. Re-write the equation in $y = mx + b$ form, identify the y-intercept and slope, then graph as in Part II above.

b. Solve for the x- and y- intercepts. To find the x-intercept, let $y = 0$ and solve for x. To find the y-intercept, let $x = 0$ and solve for y. Then plot these points on the appropriate axes and connect them with a line.

Ex. $2x = 3y = 10$

a. Solve for y.

$$= 3y = = 2x + 10$$

$$y = \frac{= 2x + 10}{= 3}$$

$$y = \frac{2}{3}x = \frac{10}{3}$$

OR

b. Find the intercepts:

let $y = 0$:

$$2x = 3(0) = 10$$

$$2x = 10$$

$$x = 5$$

So x-intercept is (5, 0)

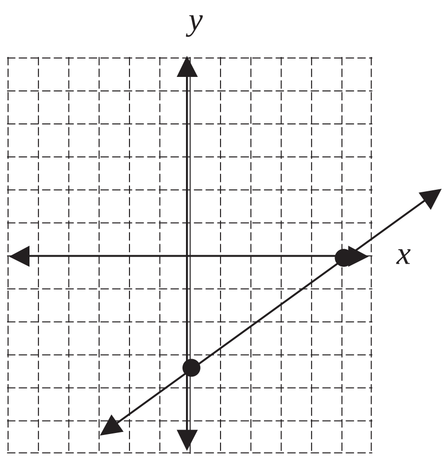
let $x = 0$:

$$2(0) = 3y = 10$$

$$= 3y = 10$$

$$y = = \frac{10}{3}$$

So y-intercept is $\left(0, -\frac{10}{3}\right)$



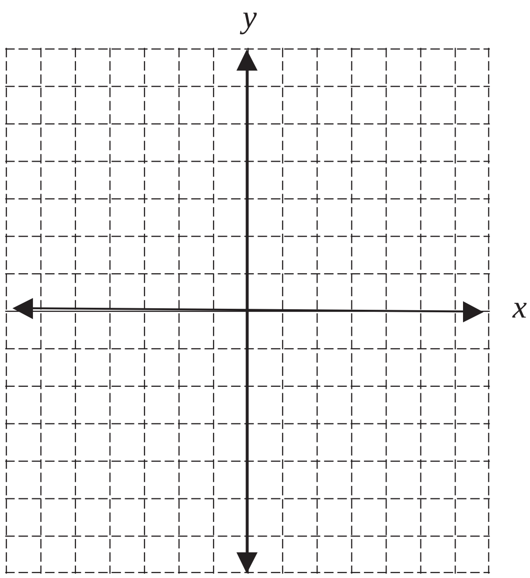
On the x-axis place a point at 5.

On the y-axis place a point at $= \frac{10}{3} = = 3\frac{1}{3}$

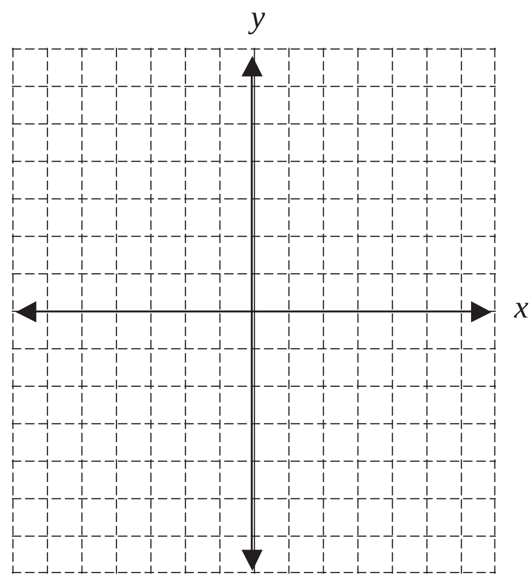
Connect the points with the line.

PRACTICE SET 10

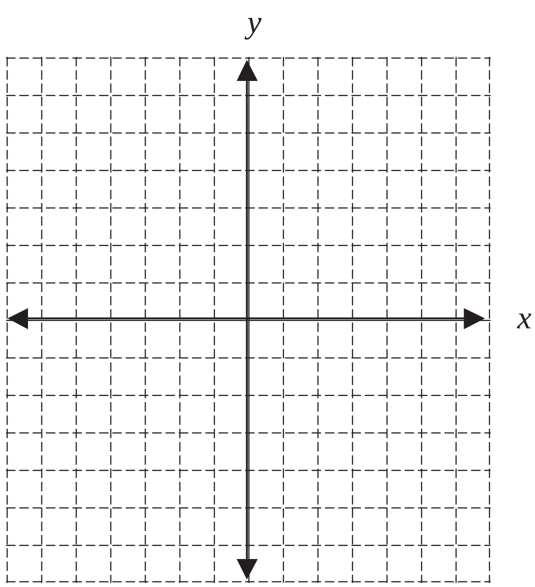
1. $3x + y = 3$



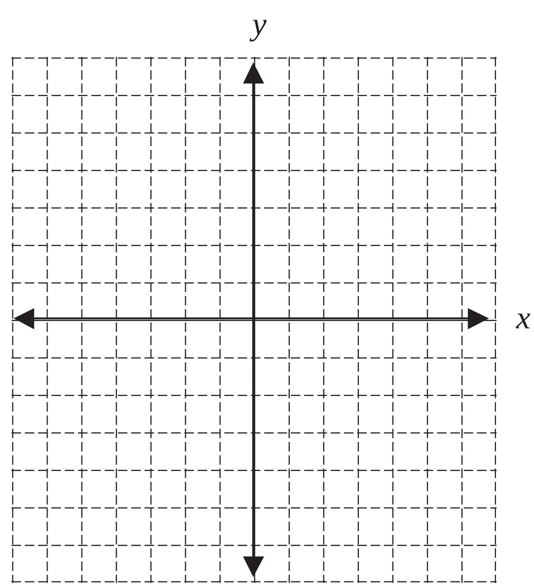
2. $5x + 2y = 10$



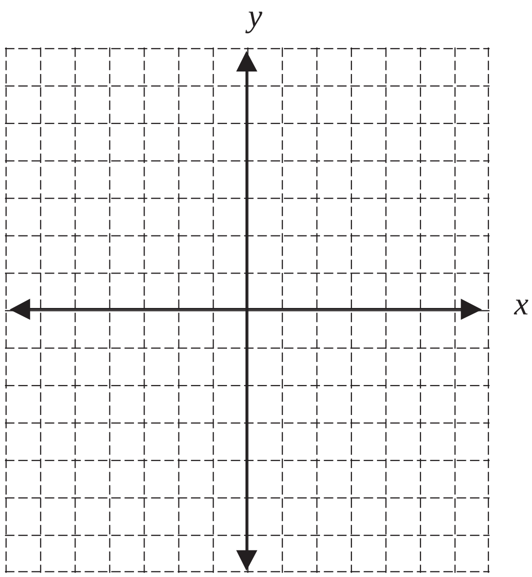
3. $y = 4$



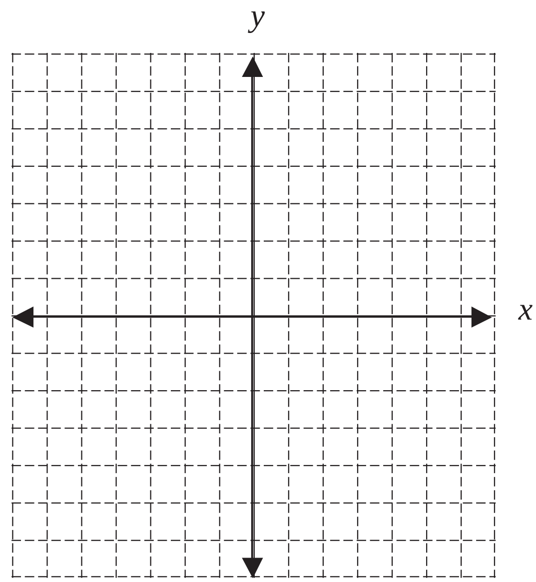
4. $4x = 3y = 9$



5. $= 2x + 6y = 12$



6. $x = = 3$



H. Algebra Basics

I. Addition and Subtraction of Fractions with the Same Denominator

To add or subtract fractions, the denominators MUST be the same.

Example 1:

$$\frac{3}{5}-\frac{1}{5}=?$$

$$\frac{3}{5}-\frac{1}{5}=\frac{3-1}{5}$$

Because both fractions have the same denominator, you may subtract the numerators and keep the denominator.

$$=\frac{2}{5}$$

Example 2:

$$\frac{5}{9}+\frac{7}{9}=?$$

$$\frac{5}{9}+\frac{7}{9}=\frac{5+7}{9}$$

Because both fractions have the same denominator, you may add the numerators and keep the denominator.

$$=\frac{12}{9}$$

$$=1\frac{3}{9}$$

Always change improper fractions to a mixed number.

$$=1\frac{1}{3}$$

Reduce, when possible.

PRACTICE SET 11: Add or Subtract as indicated.

1. $\frac{4}{8}+\frac{3}{8}$

2. $\frac{7}{10}-\frac{1}{10}$

3. $\frac{7}{48}+\frac{9}{48}+\frac{4}{48}$

4. $\frac{40}{37}-\frac{3}{37}$

5. $\frac{10}{13}+\frac{4}{13}$

6. $\frac{9}{17}+\frac{11}{17}+\frac{17}{17}$

II. Addition and Subtraction of Fractions with Different Denominators

Remember: In order to add or subtract fractions, the denominators MUST be the same.

Example:

$$\frac{2}{3}+\frac{3}{8}=?$$

LCM = 24	Find the LCM
$\frac{2}{3}\times\frac{8}{8}=\frac{16}{24}$	Write the problem vertically.
$+\ \frac{3}{8}\times\frac{3}{3}=\frac{9}{24}$	Find the equivalent fractions with the LCM as a denominator.
$\frac{25}{24}$	Add the fractions with the same denominator.
$\frac{25}{24}=1\frac{1}{24}$	Remember to write as a mixed number and reduce when possible!

PRACTICE SET 12: Add or Subtract:

1) $\frac{7}{8} + \frac{3}{4}$

2) $\frac{7}{8} - \frac{3}{4}$

3) $\frac{11}{12} + \frac{17}{18}$

4) $\frac{3}{7} + \frac{2}{5}$

5) $\frac{15}{24} - \frac{10}{27}$

6) $\frac{7}{12} + \frac{5}{16}$

7) $\frac{16}{27} - \frac{5}{24}$

8) $1\frac{1}{4} + \frac{3}{8}$

III. Subtraction of Fractions with Borrowing

Example 1:

$$7 - 1\frac{1}{3} = ?$$

Example 2:

$$5\frac{1}{3} - 2\frac{5}{6} = ?$$

Note: There are two common methods; DO NOT mix the steps of the methods!

Method 1 *Example 1*

Subtraction with Borrowing

$$\begin{array}{rl} \mathbf{7} & = 6\frac{3}{3} \\ -\ 1\frac{1}{3} & = 1\frac{1}{3} \\ \hline & \ \ 5\frac{2}{3} \end{array}$$

Write problem vertically
Cannot subtract fraction from whole without finding common denominator.

Borrow one whole from 7 and express as $\frac{LCD}{LCD}$. $\left(1 = \frac{3}{3}\right)$

Subtract numerators and whole numbers.

Example 2

$$\begin{array}{rcl} 5\frac{1}{3} = 5\frac{2}{6} & = & 4\frac{8}{6} \\ -\ 2\frac{5}{6} = 2\frac{5}{6} & = & 2\frac{5}{6} \\ \hline & & 2\frac{3}{6} = 2\frac{1}{2} \end{array}$$

Write problem vertically and find LCD
Cannot subtract 5 from 2.

Borrow one whole from 5, $\left(4\frac{6}{6}\right)$ and add $\left(5\frac{2}{6} = 4\frac{6+2}{6}\right)$.

Subtract numerators and whole numbers; reduce as needed.

Method 2 *Example 1:*

Subtraction Using Improper Fractions

$$\begin{array}{rl} \mathbf{7} & = \frac{21}{3} \\ -\ 1\frac{1}{3} & = \frac{4}{3} \\ \hline & \frac{17}{3} = 5\frac{2}{3} \end{array}$$

Write the problem vertically.

Convert the whole numbers and mixed numbers to improper fractions using the LCD.

Subtract $\left(\frac{21-4}{3}\right)$ and convert improper fraction to mixed number.

Example 2:

$$\begin{array}{rcl} 5\frac{1}{3} = 5\frac{2}{6} & = & \frac{32}{6} \\ -\ 2\frac{5}{6} = 2\frac{5}{6} & = & \frac{17}{6} \\ \hline & & \frac{15}{6} = 2\frac{3}{2} \\ & & 2\frac{3}{2} = 2\frac{1}{2} \end{array}$$

Write problem vertically and find the LCD.

Change the mixed numbers to improper fractions.

Subtract the numerators.
Convert to a mixed number.

Reduce.

PRACTICE SET 13: Subtract:

1) $5 - 2\frac{1}{3}$

2) $7 - 1\frac{1}{6}$

3) $10 - 4\frac{5}{6}$

4) $3\frac{5}{8} - 2\frac{7}{8}$

5) $1\frac{1}{8} - \frac{3}{4}$

6) $3\frac{5}{12} - 1\frac{15}{16}$

7) $8 - 6\frac{4}{5}$

8) $4\frac{3}{8} - 3\frac{5}{6}$

IV. Multiplication of Fractions

Example:

$$\frac{3}{10} \times 3\frac{5}{6}$$

Note: LCD is not needed to multiply fractions.

$3\frac{5}{6} = \frac{(6 \times 3) + 5}{6}$	Change mixed numbers to improper fractions
$\frac{3}{10} \times \frac{23}{6} = \frac{1 \times 23}{10 \times 2}$	Before multiplying, reduce by dividing any numerator with any denominator with a common factor. (3 and 6 have a common factor of 3)
$\frac{1 \times 23}{10 \times 2} = \frac{23}{20}$	Multiply numerators and denominators
$\frac{23}{20} = 1\frac{3}{20}$	Convert improper fractions to mixed numbers.

PRACTICE SET 14: Multiply:

1) $4\frac{1}{2} \times \frac{2}{3}$

2) $3\frac{1}{5} \times 1\frac{1}{4}$

3) $6 \times 1\frac{1}{9}$

4) $2\frac{1}{6} \times 1\frac{1}{2}$

5) $\frac{10}{11} \times 1\frac{7}{15}$

6) $4\frac{3}{5} \times 15$

7) $3\frac{3}{8} \times 2\frac{2}{9}$

8) $34 \times 2\frac{3}{17}$

V. Division of Fractions

Example:

$$2\frac{3}{4} \div 2\frac{3}{8} \quad \textbf{OR} \quad \frac{2\frac{3}{4}}{2\frac{3}{8}}$$

Note: One fraction divided by another may be expressed in either way shown above. Also, LCD is not needed to divide fractions.

$2\frac{3}{4} = \frac{11}{4}$ and $2\frac{3}{8} = \frac{19}{8}$ — Convert mixed numbers to improper fractions

$\frac{11}{4} \div \frac{19}{8} = \frac{11}{4} \times \frac{8}{19}$ — Invert the divisor $\left(\frac{19}{8}\right)$. (Turn the fraction after the division sign upside down)

$\frac{11 \times 8}{4 \times 19} = \frac{11 \times 2}{1 \times 19}$ — Reduce if possible. (4 and 8 have a common factor)

$\frac{11 \times 2}{1 \times 19} = \frac{22}{19}$ — Multiply numerators and denominators

$\frac{22}{19} = 1\frac{3}{19}$ — Convert to a mixed number and reduce if needed.

PRACTICE SET 15: Divide these fractions. Reduce to lowest terms!

1) $\frac{5}{6} \div \frac{1}{2}$

2) $\frac{3}{4} \div \frac{3}{7} =$

3) $3 \div 1\frac{2}{5} =$

4) $\frac{\frac{1}{2}}{\frac{1}{3}} =$

5) $\frac{1}{2} \div 6 =$

6) $2\frac{1}{4} \div 3 =$

7) $3\frac{1}{7} \div 2\frac{5}{14} =$

8) $\frac{2\frac{5}{8}}{1\frac{7}{8}}$

9) $4\frac{1}{2} \div 1\frac{3}{4} =$

Some Fraction Word Problems

Example 1:

One day Ashley biked $\frac{3}{4}$ of a mile before lunch and $\frac{7}{8}$ of a mile after lunch. How far did she cycle that day?

Note: this problem is asking you to add the distances traveled.

$$\frac{3}{4}+\frac{7}{8}$$

To add fractions, find a LCD (8).

Add the numerators; keep the denominators.

$$\frac{6}{8}+\frac{7}{8}$$

Convert improper fraction to a mixed number; reduce if needed.

$$\frac{13}{8}=1\frac{5}{8}$$

Ashley cycled $1\frac{5}{8}$ miles that day.

Example 2:

A tailor needs $3\frac{1}{4}$ yards of fabric to make a jacket. How many jackets can he make with $19\frac{1}{2}$ yards of fabric?

Note: this problem is asking you to divide.

$$19\frac{1}{2}\div 3\frac{1}{4}$$

To divide fractions, convert mixed numbers to improper fractions.

$$\frac{39}{2}\div\frac{13}{4}$$

Invert the divisor and reduce if possible, (39 and 13 have a common factor, as do 2 and 4).

$$\frac{39}{2}\times\frac{4}{13}=\frac{3\times 2}{1\times 1}$$

Multiply numerators and denominators.

$$\frac{3}{1}=3$$

The tailor can make 3 jackets from $19\frac{1}{2}$ yards of fabric.

SPRACTICE SET 16: Solve the following problems.

1. An empty box weighs $2\frac{1}{4}$ pounds. It is then filled with $16\frac{2}{3}$ pounds of fruit. What is the weight of the box when it is full?

2. Yanni is making formula for the baby. Each bottle contains $6\frac{2}{5}$ scoops of formula. The formula container holds 320 scoops of formula. How many bottles of formula can Yanni make?

3. Miguel bought $2\frac{1}{4}$ pounds of hamburger, $1\frac{1}{5}$ pounds of sliced turkey, and 2 pounds of cheese. What was the total weight of all of his purchases?

4. Sheila had 8 yards of fabric. She used $2\frac{1}{4}$ yards to make a dress. How much fabric does she have left?