

Summer Assignment Mathematics
Students entering
Algebra II Accelerated (FRESHMEN)

Directions:

- Print the document
- Show all work neatly.
- If the concepts in a particular section are more challenging, you may want to seek additional resources for extra practice.

Grading and Mastery Testing:

- Late assignments will be accepted but will be penalized based on the number of days the assignment is late.
- The first two days of class students may ask questions and the teacher will review the summer assignment.
- At the end of the first week students will be expected to take a mastery test that will consist of problems similar to those in the summer assignment.
- Any student who does not earn a grade of at least 80% on the mastery test will be expected to do remediation problems for the first quarter along with the required Algebra II Accelerated coursework.

Required Content:

- Order of operation
- Simplify expressions
- Multiplying Binomials
- Solving equations
- Verbal Expressions and Equations
- Graphing on a number line and interval notation
- Graphing lines and Writing equations of lines
- Factoring (GCF)

Algebra II Accelerated: Summer Assignment

§ Order of Operation:

Quick review:

Video help order of operation: <https://youtu.be/gjrGd9TjinY>

Video help add/subtract fractions: <https://youtu.be/gjrGd9TjinY>

P E M D A S	
Parenthesis Exponents Multiplication Division (Left to right)	Addition Subtraction (Left to right)
$(1^5 \times 5^2 + 2^3) - 2^5 \div 8$	Solve the terms in parenthesis and simplify exponentials
$(1 \times 25 + 8) - 32 \div 8$	Multiply the terms inside brackets
$(25 + 8) - 32 \div 8$	Simplify the addition terms inside the brackets
$(33) - 32 \div 8$	Perform division
$33 - 4$	Subtract the remaining terms
29	Solution

How to Subtract Fractions

Same Denominators

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

↓

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

Different Denominators

$$7 \times \frac{1}{2} - \frac{3 \times 2}{7 \times 2}$$

↓

$$\frac{7-6}{14} = \frac{1}{14}$$

#1

$$[(15 + 5) + (26 - 6)^2] + 3^2$$

Answer: _____

#2

$$6(2 + 18 - 9) + (3 \times 4)^2$$

Answer: _____

#3

$$[(3 + 2)^2 + (10 + 1)] + 2^3$$

Answer: _____

#4

$$[-12 \div (-4)] \times [144 \div (15 - 3)]$$

Answer: _____

#5

$$(6 \times 7) + 26 + 1^2 - 5$$

Answer: _____

#6

$$5 + [3 \times (35 \div 7)]$$

Answer: _____

#7

$$15 \div 5 + (36 \div 12)^2 - 4$$

Answer: _____

#8

$$8(5^2 + 15) - (7 + 13)$$

Answer: _____

#9

$$[(9 \times 4) \div 12] + 5 - 4^2$$

Answer: _____

#10

$$3[(9 + 14) - (81 \div 9)]$$

Answer: _____

Evaluate each expression.

1) $\frac{3}{2} + \frac{5}{4} - \frac{1}{3}$

2) $\frac{1}{4} + 1 - \frac{1}{5}$

3) $\left(\frac{3}{2}\right)^2 + \frac{3}{2}$

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

5) $\frac{2}{3} + 2 - \frac{11}{6}$

6) $3 + \frac{3}{2} \cdot \frac{5}{4}$

§ Simplifying Expressions:

Quick review:

Video help simplifying expressions: <https://youtu.be/FNnmseBlvaY>

Simplify Algebraic Expressions

1. If there are any parentheses use the distributive property to clear parentheses by multiplying the factors by the terms inside the parentheses.
2. Combine Like Terms.

Example:

$$\begin{aligned} & 5(2x^3 + 5x^2 - 8) - 3(4x^2 + 5x - 2) \\ &= 10x^3 + 25x^2 - 40 - 12x^2 - 15x + 6 \\ &= 10x^3 + 13x^2 - 15x - 34 \end{aligned}$$

1) $13x + 3y + 2x =$ _____

2) $4x^2 + 3y + 5x + 6x^2 =$ _____

3) $7y + 4y + 5x =$ _____

4) $2y^2 + 6y + 4y + 10y^2 =$ _____

5) $9x + y - 3x =$ _____

6) $x^2 + 8y - 4y + 8x^2 =$ _____

7) $17x - 5x + 3y - y + 2x =$ _____

8) $2y^2 + 2y + 2y + 2x^2 =$ _____

9) $21x + 4y - 5x =$ _____

10) $13x^2 + 3y + x + 6x^2 =$ _____

§ Multiplying Binomials:

Quick review:

Video help Multiplying binomials: <https://youtu.be/ZMLFfTX615w>

FOIL Method

$(2x + 3)(5x - 8)$

First: $(2x)(5x) = 10x^2$
Outer: $(2x)(-8) = -16x$
Inner: $(3)(5x) = 15x$
Last: $(3)(-8) = -24$

$(2x + 3)(5x - 8)$
 $= 10x^2 - 16x + 15x - 24$
 $= 10x^2 - x - 24$

Find each product.

1) $(5x + 4)(6x - 3)$

2) $(4n - 7)(n - 7)$

3) $(n - 3)(2n + 8)$

4) $(3n + 6)(5n + 1)$

5) $(3x + 6)(5x - 8)$

6) $(4n - 7)(4n - 2)$

§ Solving Equations:

Quick review:

Video help Solving literal equations: <https://youtu.be/fnuIT7EhAvs>

Video help solving equations with variables on both sides: <https://youtu.be/1c5HY3z4k8M>

Video help solving proportions: <https://youtu.be/GO5ajwbFqVQ>

How to solve Multistep Equations

1. Simplify each side
2. Eliminate the variable from the right side
3. Eliminate the constant term from the left side
4. Divide each side by the coefficient

Example:

$$3(x + 1) = 5 + x$$

$$3x + 3 = 5 + x$$

$$2x + 3 = 5$$

$$2x = 2$$

$$x = 1$$

Example:

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

$$2x - 1 = 3x + 3$$

$$-x - 1 = 3$$

$$-x = 4$$

$$x = -4$$

Solve Literal Equations

A literal equation is an equation with more than one variable.

To solve a literal equation means to isolate the indicated variable.

We can use inverse operations to isolate the variable.

1. If necessary, simplify each side of the equation by combining like terms.
2. Isolate the indicated variable -
 - a) Use the opposite operation of addition or subtraction to move any constants or variables to the other side.
 - b) Use the opposite operation of multiplication or division to eliminate the coefficient.

Examples:

Solve for x

$$3x + 4y = 7$$

$$3x = 7 - 4y$$

$$x = \frac{7 - 4y}{3}$$

Solve for F

$$C = \frac{5}{9}(F - 32)$$

$$\frac{9}{5}C = F - 32$$

$$\frac{9}{5}C + 32 = F$$

$$F = \frac{9}{5}C + 32$$

Solve each equation for the indicated variable.

1) $kx = w + v$, for x

2) $z = am + b$, for a

3) $\frac{k}{a} = wv$, for a

4) $mx = \frac{n}{p}$, for x

Solve each equation.

$$5) 2m - 14 = 6(1 + 2m)$$

$$6) 7a - 1 = 4(1 + 2a)$$

$$7) -(1 + 6x) = -1 - 6x$$

$$8) 6 + 6n = 8(-8 + 2n)$$

$$9) 39 - a = 4(4 - a) + 5$$

$$10) 1 + 6(5x + 3) = 5x - 6$$

Solve each proportion.

$$11) \frac{9}{4} = \frac{k}{3}$$

$$12) \frac{3}{x} = \frac{10}{3}$$

$$13) \frac{10}{2} = \frac{4}{v - 3}$$

$$14) \frac{4}{v - 5} = \frac{3}{8}$$

§ Verbal Expressions and Equations:

Quick review:

Video translating verbal expressions: <https://youtu.be/ypxHVqE26qI>

Addition	Subtraction	Multiplication	Division
plus the sum of increased by total more than added to	minus the difference of decreased by fewer than less than subtracted from	times the product of multiplied by of	divided by the quotient of per

Example:

$x + 2$	Add 2 to any number.
$10 - c$	Subtract any number from 10.
$\frac{2}{n}$	Divide 2 by any number.
$\frac{1}{2}x$	Multiply any number by one-half.
$2m + 3$	Multiply any number by 2, and then add 3.
$\frac{t + 3}{2}$	Add 3 to any number, and then divide by 2.
$3d$	Multiply any number by 3.
$p - 3$	Subtract 3 from any number.
$\frac{x}{2}$	Divide any number by 2.
$2(g + 3)$	Add 3 to any number, and then multiply by 2.
$\frac{x}{2} + 3$	Divide any number by 2, and then add 3.
$\frac{h}{h}$	Divide any number by itself.
a^2	Multiply any number by itself.

Write the phrase as a variable expression. Use x to represent “a number”

- 133 less than a number. _____
- 3 more than 6 times a number. _____
- The quotient of a number and 4, decreased by 7 _____

Write the sentence as an equation. Use x to represent “a number.”

4. A number added to -13 equals -23 _____
5. Six times the sum of a number and -114 equals -42 _____
6. Seven times the difference of 18 and a number amounts to -35 _____
7. Eleven subtracted from a number amount to 50 _____

§ Interval Notation:

Quick review:

Video help interval notation and graphing inequalities: <https://youtu.be/UJQkqV2zGv0>

When using interval notation, the symbol:	
(means "not included" or "open".
[means "included" or "closed".

Open Interval: $(1, 4)$ (a, b) means $a < x < b$	
Closed Interval: $[1, 4]$ $[a, b]$ means $a \leq x \leq b$	
Half-Open Interval: $(1, 4]$ $(a, b]$ means $a < x \leq b$	
Half-Open Interval: $[1, 4)$ $[a, b)$ means $a \leq x < b$	
Non-end Interval: $(1, \infty)$ (a, ∞) means $x > a$	
Non-end Interval: $(-\infty, 4]$ $(-\infty, b]$ means $x \leq b$	

	Inequality	Interval Notation	Graph
Ex	$-3 \leq x < 5$	$[-3, 5)$	
Ex	$x > 2$	$(2, \infty)$	
1	$x \leq 3$		
2	$x < 1$ or $x \geq 5$		
3	$-4 < x < 3$		
4	$-2 \leq x \leq 2$		
5	x is any real #		

§ Graphing a line:

Quick review:

Video help graphing in slope intercept form: <https://tinyurl.com/yb8mxfee>

How to graph a Linear Equation?

Plot Points

1. Pick any value for x.
2. Substitute into the equation to get the corresponding y value.
3. Plot the point on the graph.
4. Repeat from step 1 to plot another point.
5. Join the two points with a straight line.

X and Y-Intercepts

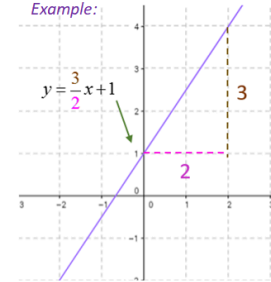
1. To find the x-intercept, set $y = 0$ and solve for x.
2. To find the y-intercept, set $x = 0$ and solve for y.
3. Plot the x-intercept and the y-intercept.
4. Join the two points with a straight line.

Slope-Intercept Form

$$y = mx + b$$

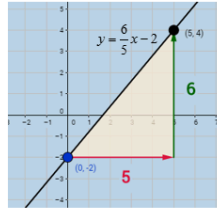
slope of line y intercept, where the line crosses the y-axis at (0,b)

Example:



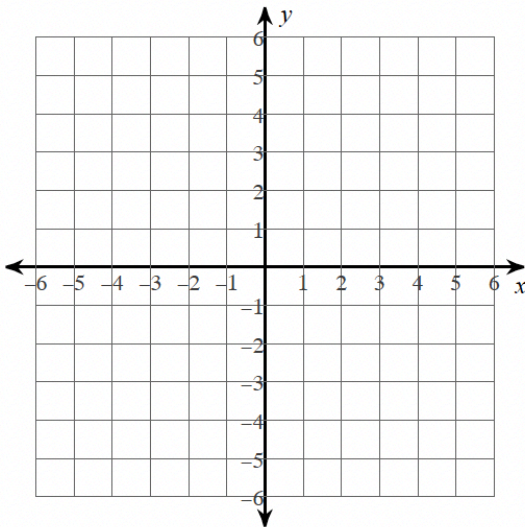
Slope-Intercept

1. Find the y-intercept and plot the point.
2. From the y-intercept, use the slope to find the second point and plot it.
3. Join the two points with a straight line.

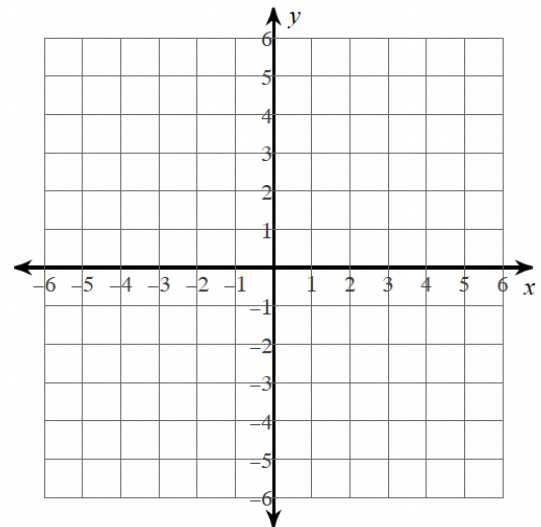


Sketch the graph of each line.

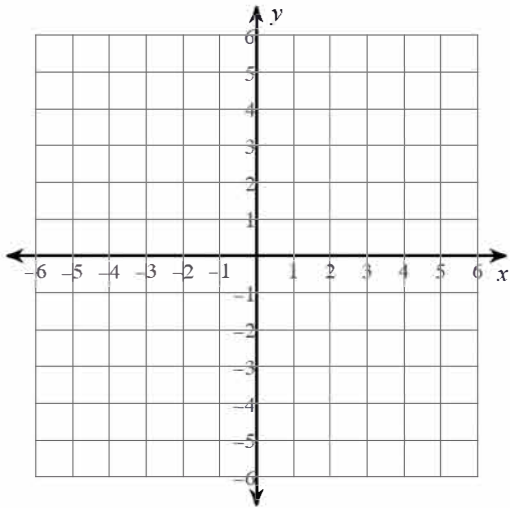
1) $y = -2x + 4$



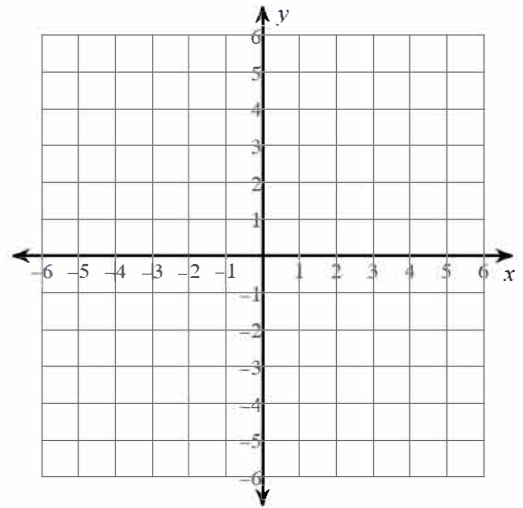
2) $y = -\frac{2}{5}x - 1$



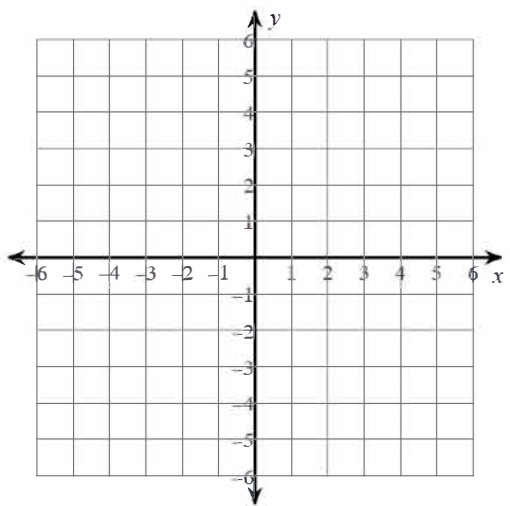
3) $x = 3$



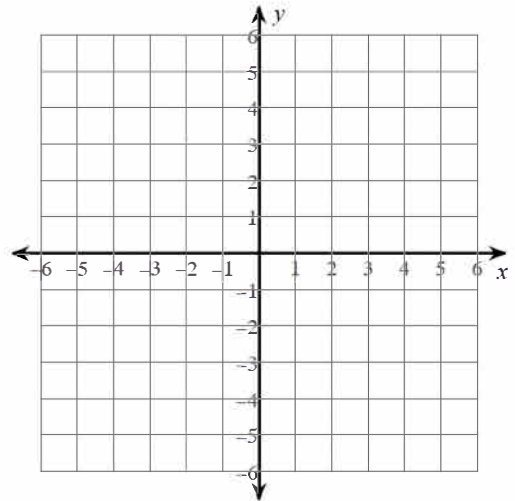
4) $y = 3$



5) $y = 3x - 4$



6) $y = \frac{5}{3}x$



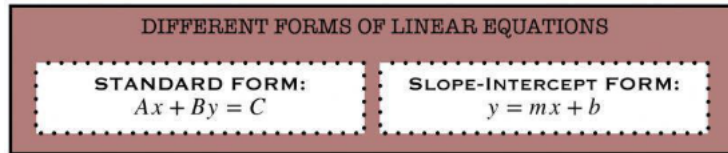
§ Writing equation of lines:

Quick review:

Video help writing equations from a graph: <https://tinyurl.com/5etx74vy>

Video help writing equations given slope and point: <https://tinyurl.com/yvbc8vcw>

Video help writing equations given two points: <https://tinyurl.com/bdy43evm>



Write an Equation in Slope-Intercept Form

A line passing through (2,2) and (3,4)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad y = mx + b$$
$$m = \frac{4 - 2}{3 - 2} = 2 \quad 4 = 2(3) + b \quad y = mx + b$$
$$4 = 6 + b \quad y = 2x - 2$$
$$-2 = b$$

Point-Slope Form Example Problems

Point-Slope Form

$$y - y_1 = m(x - x_1)$$

Problem:
Write the point-slope form equation of a line with a slope of 3 that passes through the point (1,10).

$$y - 10 = 3(x - 1)$$

substitute

$$m = 3 \quad (1, 10)$$
$$x_1 \quad y_1$$
$$y - 10 = 3(x - 1)$$

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

1) Slope = $-\frac{1}{5}$, y-intercept = 3

2) Slope = $-\frac{1}{2}$, y-intercept = 4

3) Slope = -1, y-intercept = 0

4) Slope = -2, y-intercept = 3

Write the slope-intercept form of the equation of the line through the given point with the given slope.

5) through: (4, -2), slope = -1

6) through: (-3, 4), slope = -3

Write the slope-intercept form of the equation of the line through the given points.

7) through: (-1, 2) and (0, 5)

8) through: (-2, 0) and (0, -4)

§ Factoring:

Quick review:

Video help with factoring GCF: <https://tinyurl.com/4ehbjbn>

Video help with factoring trinomials $a=1$: <https://tinyurl.com/28e4j425>

Binomial

2 Terms

$$\begin{array}{c} 8x + 4 \\ \downarrow \text{GCF} \\ 4(2x + 1) \end{array}$$

The factors of $8x + 4$ are:

$$4 \text{ \& } (2x + 1)$$

Factor the common factor out of each expression.

1) $-21k^2 - 7k$

2) $45x^3 + 36x$

3) $35a + 49$

4) $25k + 30k^2$