Algebra 2 CPA Summer Assignment 2023

This assignment is designed for you to practice topics learned in Algebra 1 that will be relevant in the Algebra 2 CPA curriculum. This review is especially important as you have most recently studied Geometry, where your Algebra 1 skills may have been employed with less frequency.

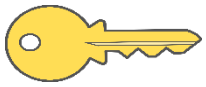
A topic list along with links to selected videos is outlined on the following page should you need help with the concepts. The videos can also be found on YouTube under the channel MATHCamp321 (under the Algebra 2 playlist). The answer keys will be posted the last week of August on the THS website under Mathematics Department Files. It is suggested that you review your answers and identify your questions at the END of the summer so that the material is fresh when school resumes.

You should bring the completed assignment along with any questions to class on the first day of school. Your questions will be reviewed during the initial days of school. An assessment on the assignment will be given at the conclusion of the first week of school.

Algebra Topic	Video MATHCamp321
1. Solving Linear Equations	HERE HERE
2. Solving Absolute Value Equations	HERE
3. Interval Notation ******enrichment topic***	HERE
4. Solving Compound Inequalities	HERE
5. Slope, intercepts, and writing equations in various forms (plus parallel and perpendicular)	HERE HERE
6. 2 by 2 Systems	
7. Rules of Exponents	HERE
8. Polynomial operations: Add, subtract, distribute, FOIL, clamshell.	HERE HERE
9. Factoring	HERE HERE
10. Radicals - simplify and operations (square roots only)	
11. Solve quadratic equations by factoring	

Algebra 2 CPA Summer Packet

Solving Linear Equations with Fractional Coefficients



For these problems, you should be able to:

A) **determine** the LCD when given two or more fractions

B) **solve** a linear equation with fractional coefficients

Solve each equation with fractional coefficients. Check your solutions with the video.

1V. $\frac{5}{2}x+\frac{2}{3}=\frac{1}{6}(x-3)$

2V. $\frac{2}{3}-\frac{4}{5}x=\frac{3}{2}x-\frac{3}{5}$

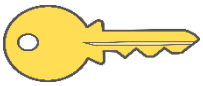
Independent Practice:

3. What is the LCD of the three fractions? $\frac{?}{4},\frac{?}{5},\frac{?}{3}$

4. Solve: $\frac{3}{4}+\frac{2}{5}x=\frac{1}{3}(x-2)$

5. Solve: $\frac{3}{2}(6x-4)=\frac{13}{2}$

Solving Absolute Value Equations



For these problems, you should be able to:

A) **solve** an absolute value equations using two cases

B) **identify** extraneous solutions by checking your answer

If you need assistance, watch the corresponding video on MathCamp321.

Solve each absolute value equation showing work as per the video.

1V. $2|x-3|+1=15$

2V. $|x+5|+12=10$

3V. $|2x-4|=x-8$

Independent Practice:

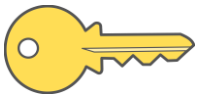
4. Solve: $|x-3|=7$

5. Solve: $-|5x|=10$

6. $-2|8-x|=-6$

7. $|x+3|=3-x$

Flip WS: Point-slope Form

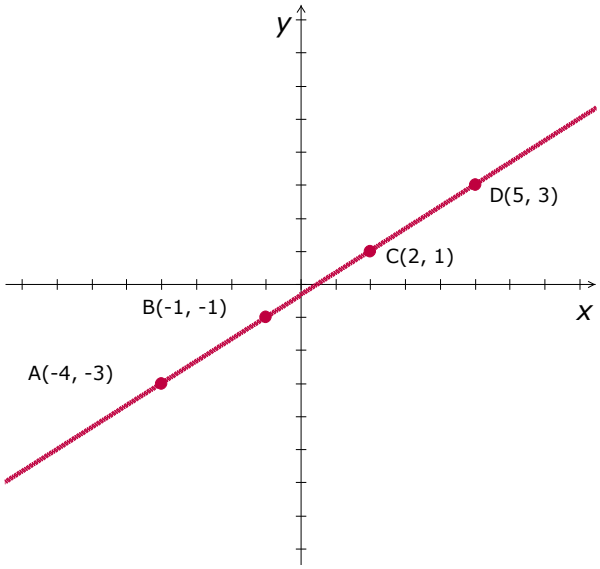


For these problems, you should be able to:

A) **write** a linear equation in point-slope form
B) **understand** that a single line has infinitely many point-slope forms
C) **transform** a linear equation in point-slope form into slope-intercept form

Point-slope form:

1V. Show the calculation to find the slope of $\overleftrightarrow{CD}$.



2V. Write the **point-slope** form using point **A**.

3V. Write the **point-slope** form using point **B**.

4V. Write the **point-slope** form using point **D**.

<u>Independent Practice</u>:

5. Write the **point-slope** form using point **C** in the line shown on the page before.

Practice: Slope and Equations of Lines

Slope-Intercept Form: $y = mx + b$

Standard Form: $ax + by = c$, where a, b, and c are integers and $a \geq 0$.

Point-Slope Form: $y - y_1 = m(x - x_1)$

Equation of a Vertical Line: $x = c$, where c is any real number.

Equation of a Horizontal Line: $y = c$, where c is any real number.

Neatly show all work. Use the indicated form. Box in your final answers.

1. Write the following in **slope-intercept form**: $2x - 5y = 8$

2. Transform the following into **standard form**: $y = \frac{5}{4}x - \frac{3}{2}$

3. Write the line with the following conditions into **point-slope form**: passes through $\left(-7, \frac{1}{2}\right)$ and has a slope of 9.

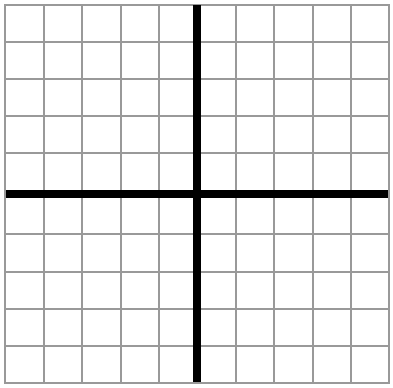
4. In **point slope form**, write the equation of the line that passes through the points (-5, -1) and (4, 5).

Practice: Graphing Inequalities

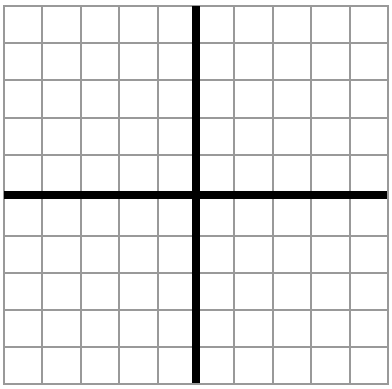
Solid or dotted? Where to shade? FLIP THE SWITCH?

A) Write the related equation and sketch.
B) Select test points in each resulting region and shade accordingly.

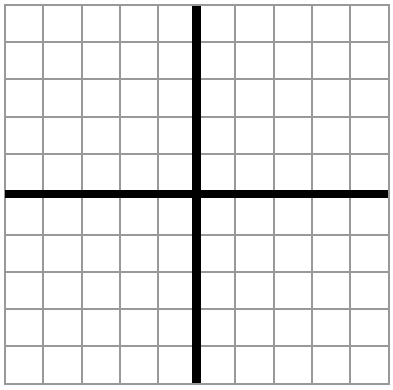
1. Sketch: $y \leq \frac{1}{2}x - 1$



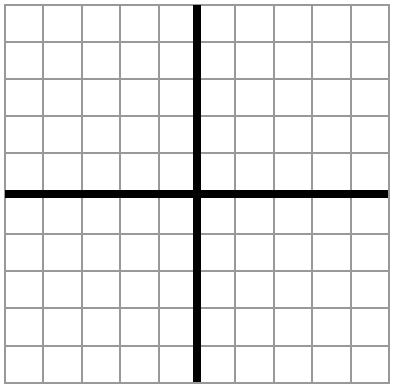
2. Sketch: $x < 4$



3. Sketch: $2y \geq 2x - 4$



4. Sketch: $x - y > 1$



Practice: 2x2 Systems

I. Solve each system by **<u>elimination</u>**. Express your solution as an ordered pair [i.e. (-3, 6)]

1. $\begin{cases} 4x - 5y = 17 \\ 3x + 4y = 5 \end{cases}$

2. $\begin{cases} 2x - y = -1 \\ 2y + 5x = -16 \end{cases}$

II. Solve each system by **substitution**. Express your solution as an ordered pair.

3. $\begin{aligned} 2x + y &= 11 \\ 6x - 2y &= -2 \end{aligned}$

4. $\begin{aligned} 6x + 3y &= 12 \\ 2x &= 8 - y \end{aligned}$

III. 2 x 2 Applications: For the following problems, set up a system of equations and solve using any method.

5. 35 lights are needed to light up the stage in The Lion King on Broadway. Only 100 watt and 150 watt fixtures are available. The total allowable wattage is 4000 watts. How many of each type of fixture will be used?

Flip WS: Monomials – Rules of Exponents

A **monomial** is an expression that is a number, a variable, or the product of a number and a variable. Monomials can **not** contain variables in denominators, variables with negative exponents, or variables under radicals. A **constant** is a monomial that contains no variables. A **coefficient** in the number that proceeds a variable. The **degree** of a monomial is the sum of its exponents.

RULES OF EXPONENTS

$x^0 = 1$	Anything raised to the power of zero equals 1. ($x \neq 0$)
$x^a \cdot x^b = x^{a+b}$	When multiplying powers of the *same* base, retain the base and **add** the exponents.
$\frac{x^a}{x^b} = x^{a-b}$	When dividing powers of the *same* base, retain the base **subtract** the exponents.
$\left(x^a\right)^b = x^{a \cdot b}$	When raising a power to a new power, **multiply** the exponents.
$(xy)^a = x^a \cdot y^a$	When several factors are raised to a power, each factor will feel the effect of the exponent.
$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$	When a fraction is raised to a power, both the numerator and denominator will feel the effect of the exponent.
$x^{-a} = \frac{1}{x^a}$; $x^a = \frac{1}{x^{-a}}$	When a term is raised to a negative exponent, the term is sent to the denominator, and the exponent changes sign (from negative to positive) and vice-versa.
$\left(\frac{x}{y}\right)^{-a} = \left(\frac{y}{x}\right)^a$	When a fraction is raised to a negative exponent, the fraction flips and the exponent changes sign.

For #s 1-10, simplify on your own. Check your answers by watching the video link on MATHCamp321.

1V. **[video 1]** $\left(-2a^3b\right)\left(-5ab^4\right)$

2V. **[video 1]** $\frac{s^2}{s^{10}}$

3V is a challenge!!

3V. **[video 1]** $\frac{10^{(x-3)(x+3)}}{10^{x^2-6}}$

4V. **[video 1]** $\left(b^2\right)^3$

5V. **[video 2]** $\left(-3c^2d^5\right)^3$

6V. **[video 2]** $\left(\frac{x}{3}\right)^{-4}$

Practice: Polynomials – Operations

A **polynomial** is a monomial or a sum of monomials.
A **binomial** is a polynomial with 2 terms.
A **trinomial** is a polynomial with 3 terms.
The **terms** are the monomials that make up a polynomial.
The **degree** of a polynomial is the degree of monomial of highest degree.

Video : 12:41 (#s 1-15 ODD)

Simplify on your own. Check your answers by watching the video link on MATHCamp321.

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

3V. $-(y^2+2y-3)+(5y^2+3y+4)$

5V. $2x(x^2-x+3)$

9V. $(2x+3)(4x+1)$

11V. $(3x-y)(3x+y)$

13V. $(3-5x)^2$

Flip WS: FACTORING POLYNOMIALS

Video 1 [12:14]

Video 2 [14:35]

① GCF – ★*greatest common factor*
② DOTS – *difference of two squares*
③ SOC/DOC – *sum of cubes / difference of cubes*
④ FAST – *factoring a simple trinomial - trinomial factoring w/ leading coefficient = 1*
⑤ Nobes' – *trinomial factoring w/ leading coefficient ≠1*
⑥ PST – *perfect square trinomial*
⑦ *grouping*

Factor completely. Check your answers by watching the video link on MATHCamp321.

1. $25a^6b^5c^7-35a^4b^5c^3+15a^5b^6c^4$

2V. $a^2(x-2y)-b(x-2y)-(x-2y)$

3V. $4a^2 - 81b^2$

4. $16x^4 - 25y^2$

9V. $x^2 - 9x - 36$

10. $y^2 + 3y - 28$

11V. $z^2 + 25z + 100$

12V. $xy^2 + x - 2y^2 - 2$

13. $a^3 + 3a^2b - 2ab - 6b^2$

Practice: Irrational Square Roots

For these problems, you should be able to: simplify irrational square roots.

Find each square root. Use simplest radical form for non-perfect squares.

1. $\sqrt{75}$

2. $6\sqrt{45}$

3. $\sqrt{48}$

Practice: Multiplying and Dividing Radicals

Rule: When multiplying radicals, multiply the numbers on the **OUTSIDE** together, then multiply the numbers on the **INSIDE** of the radical together and simplify if possible.

Multiply.

4. $3\sqrt{2} \cdot 5\sqrt{2}$

5. $-\sqrt{3} \cdot 2\sqrt{3}$

6. $\sqrt{2} \cdot \sqrt{50}$

Practice: Combining Radicals

Combine.

7. $20\sqrt{2} - 5\sqrt{2} - 3\sqrt{2}$

8. $\sqrt{16} + 2\sqrt{25}$

Practice: Solving Quadratic Equations by Factoring

Zero Product Property: for any real numbers *a* and *b*, if *ab* = 0, then either *a* = 0, *b* = 0, or both *a* and *b* equal 0.

Use **factoring** to solve to solve each quadratic equation.

1. $x(x-6) = 0$

2. $x^2 + 10x = 0$

3. $x^2 = x$

4. $x^2 = 9$

5. $x^2 - 25 = 0$

6. $4x^2 - 9 = 0$

7. $x^2 - x - 6 = 0$

8. $x^2 - 8x + 15 = 0$

9. $x^2 + 14x = 32$