

**Christian Heritage School**  
**2022 Required Summer Review Work**  
**for all students enrolling in Honors Algebra 2**

(based on content studied in Algebra 1 & Algebra 2 Common Core from Pearson)

Objective: Summer review will help students to review and practice needed skills in preparation for Honors Algebra 2.

*This assignment contains a summary of prerequisite concepts and sample problems for all students enrolling in Honors Algebra 2 for Fall 2022 to complete. The work is organized by concept, with some sample problems for each. Students could potentially be quizzed on this assignment in early September.*

There are some great resources available online if you are stuck or in need of more practice. For example, Khan Academy has many resources for Algebra studies.

Please complete the entire assignment and check your answers, which are included at the end. Graphs can be checked using a graphing calculator or Desmos.

**Calculators- a note about Honors Algebra 2 for Fall 2022:**

A graphing calculator will be required. **All classroom instruction will take place with a TI-84 (Plus or Plus CE).** While students may use any graphing calculator model they choose, class time will not be used for figuring out other calculator models. (The TI-83 Plus is the same calculator with less memory and processing speed and slightly fewer capabilities, but it is sufficiently similar in function to easily follow along in class.)

1. Solving Multi Step Equations

- a. Simplify ( ); add like terms on either side; get the variable on one side; get the constants to the other side; divide by the coefficient of x.
- b. Solving literal equations and formulas for an indicated variable
- c. Solving proportions (cross multiply and divide)
- d. Solve:  $\frac{3}{5} = \frac{y+1}{9}$
- e. Solve:  $5m + 4(-5 + 3m) = 1 - m$
- f. Solve:  $\frac{1}{2}x + \frac{1}{3}(x - 6) = \frac{5}{6}x + 2$
- g. Solve the equation for y:  $4x = 3y - 7$
- h. Solve  $E = \frac{1}{2}mv^2$  for  $m$

2. Relations and Functions

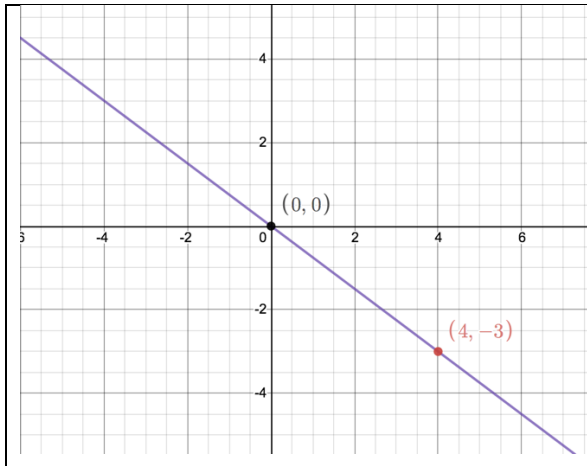
- a. A relation is a function if every input is paired with exactly one output (no repeat of inputs); graphically a function passes the vertical line test. A function is one-

to-one if it (graphically) passes the horizontal line test or (numerically) if there is no repeat of outputs.

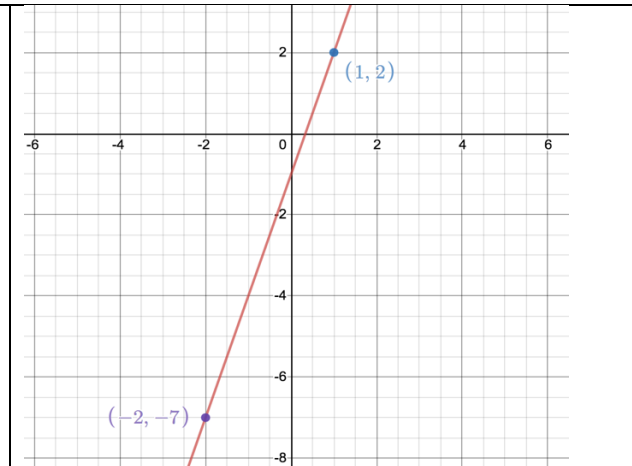
- b. Is the following relation a function? Find its domain and range. If it is a function, is it one-to-one?  $\{(10, 2), (-10, 2), (6, 4), (5, 3), (-6, 7)\}$

3. Linear functions and slope-intercept form

- Slope formula:  $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Positive slope, negative slope, zero slope, undefined slope
- Slope-intercept form  $y = mx + b$
- Point-slope form  $y - y_1 = m(x - x_1)$
- Parallel lines (same slope) and perpendicular lines (opposite reciprocal slope)
- Find the slope of the line shown in the first Desmos graph (below)
- Find the slope of the line passing through the points  $(-1, 2)$  and  $(2, -3)$ .
- Sketch the graph of the line  $y = \frac{-2}{3}x + 4$
- Write an equation of the line in point-slope form with slope 4 passing through the point  $(-2, -5)$
- What is the slope of a line that is parallel to the graph of  $y = -3x - 7$ ?
- What is the slope of a line that is perpendicular to the graph of  $4x + 2y = 11$ ?
- Write the equation of the line in slope-intercept form that is shown in the 2<sup>nd</sup> Desmos graph (below)
- Standard form linear equations:  $Ax + By = C$
- Find intercepts by letting the other variable = 0 ("cover-up" method)
- Find the x- and y- intercepts of the equation  $3x - 2y = 12$ . Then graph it.



3f



3l

4. Solving systems of equations

- Solving by substitution and/or elimination
- (suggested to use elimination)

Solve  $4x + 2y = 34$

$$10x - 4y = -5$$

- c. (suggested to use substitution)

$$\text{Solve } x = y + 7$$

$$y - 8 = 2x$$

- d. (suggested to use substitution)

$$\text{Solve } y = \frac{4}{3}x - 2$$

$$3y - 4x = -6$$

- e. Reminder:  $0=12$  is no solution (lines are parallel);  $4=4$  or  $0=0$  is infinitely many solutions (both equations represent the same line)
- f. To solve a linear system by graphing, find the point of intersection of the two lines
- g. Solve by graphing:  $y = 3x - 4$   
 $y = -.5x + 3$

## 5. Factoring quadratic expressions

- Factoring is rewriting an expression as a product of factors; in other words, it's the reverse of foiling or the box problem.
- Always remember to begin by factoring out the GCF. If the highest powered term is negative, factor out the negative to make the rest of the problem easier.
- Keep an eye out for the special patterns: difference of two squares and perfect square trinomials.
- Remember that not every expression is factorable.
- Factor  $x^2 - 4$
- Factor  $k^2 - 18k + 81$
- Factor  $3x^2 + 31x + 36$
- Factor  $81y^2 + 49$
- Factor  $4x^2 + 16x + 8$
- $3t^2 - 24t$

## 6. Quadratic Equations

- To solve quadratic equations by factoring, gather all terms on one side, factor (as in section #5 above), and then set each factor equal to zero and solve.
- Solve by factoring:  $x^2 + 18 = 9x$
- Solve  $5x^2 = 80$  by finding square roots.

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ANSWERS to non-graphing calculator questions:

1d.  $y = 4.4$

1e.  $m = \frac{7}{6}$

1f. no solution

1g.  $y = \frac{4x+7}{3}$

1h.  $m = \frac{2E}{v^2}$

2b. yes; D:  $\{-10, -6, 5, 6, 10\}$ ; R:  $\{2, 3, 4, 7\}$ ; not one-to-one

3f.  $-\frac{3}{4}$

3g.  $-\frac{5}{3}$

3h. (graph)

3i.  $y + 5 = 4(x + 2)$

3j.  $m = -3$

3k.  $m = \frac{1}{2}$

3l.  $y = 3x - 1$

3o.  $(4, 0)$  and  $(0, -6)$

4b.  $(3.5, 10)$

4c.  $(-15, -22)$

4d. infinitely many solutions

4g.  $(2, 2)$

5e.  $(x + 2)(x - 2)$

5f.  $(k - 9)^2$

5g.  $(3x + 4)(x + 9)$

5h. not factorable

5i.  $4(x^2 + 4x + 2)$

5j.  $3t(t - 8)$

6b.  $x = 3, 6$

6c.  $x = \pm 4$