Accelerated Algebra I/ Geometry A: Summer Assignment 2020-2021

Welcome!

This packet includes a sampling of problems that students entering Accelerated Algebra I/Geometry A should be able to answer.

Accelerated Algebra I/Geometry A is the first in a sequence of mathematics courses designed to ensure that students are prepared to take higher-level mathematics courses during their high school career, including Advanced Placement Calculus AB, Advanced Placement Calculus BC, and Advanced Placement Statistics.

This is a fast-paced and rigorous college-preparatory math course that includes substantial work with the skills and concepts presented in each lesson. In order to be successful in this program you must be prepared for class each day by completing all assignments and studying each night. You will be required to think, to apply what you know in new and different situations, and to use problem-solving skills. The course is one in which the concepts from the beginning lessons build upon one another and are essential to the mastery of the material that will be encountered later in the semester. In order to be successful, you must have strong foundational math skills and be consistent with your homework and study habits. It is our hope that you will not only learn the major concepts of this course but that you will also become more independent in your learning and study habits, skills that you will need to be successful in future honors-level and AP courses. It is your responsibility to be the best student you can be!

The practice/review problems represent topics from Middle School Math courses that you will be using regularly in Accelerated Algebra I/Geometry A. Because of the pace of our curriculum, there may not be too much time to be spent in class reviewing skills that were presented in the pre-requisite courses. This packet represents a brief review of some of those topics that will be an important foundation for this course. Work all of the problems neatly on separate paper, numbering your work. You must show work for each problem, not just an answer. Your final answer for each problem should be recorded on the answer sheet.

These review problems represent your first graded assignment for this course. Your work will be graded for completeness and accuracy. It is extremely important for all students to review the concepts contained in this packet and to be prepared for an assessment of prerequisite skills to take place within the first week of school.

Please let me know if you have any questions at: payne.todd@mail.fcboe.org

Directions

Complete all problems <u>neatly</u> and <u>completely</u> on another sheet of paper in the order in which they appear in the packet. Number each problem and circle your solutions. Record all final answers on the answer sheet. Credit will only be given if ALL WORK IS SHOWN AND TURNED IN along with the answer sheet. Make note of any questions you may have as you work through the problems.

Part I: Simplifying Expressions

- Combine Like Terms
- Use Distributive Property
- If multiplying exponents, add the exponents
- If dividing exponents, subtract the exponents

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Simplify each expression.

1) $x^2 (2x + 5) - (x - 10)$

2) $\dfrac{8x^2y^5z^2}{2xy^3z}$

3) $15 (3xy)$

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

Part II: Solving Equations and Inequalities

Solve each equation. Show all steps. If there is no solution, write "no solution". If the problem involves an inequality, then graph your solution on a number line.

1) $4x - 7 = 13$

2) $2y + 3 + 7y = 30$

3) $\dfrac{2}{3} x = 6$

4) $\dfrac{3}{4} x = \dfrac{3}{2}$

5) $-x + 5 > -4$

6) $6m - 3 \leq 2m + 5$

7) $\dfrac{x+5}{3} = -15$

8) $\dfrac{1}{2}h + \dfrac{3}{4} = \dfrac{9}{4}$

9) $3(6 - 9m) = -9(3m - 2)$

10) $2x^2 = 32$

11) $.45(8) < 1.20 + .48(8 - x)$

12) $8x - 5 + 2x \geq 5 + 5x - 12$

13) $\dfrac{5}{6}x - \dfrac{1}{3} = x - \dfrac{3}{2}$

14) $9(x + 1) - 3x = 2(3x + 1) - 4$

15) $2\{x-3(2x + 5)\} = 5x-(3x+6)$

16) $|6x - 3| = 15$

17) $|2x + 7| = -11$

18) $3|2 - 4x| + 2 > 32$

18)   If $7x - 2 (3 - 4x) = 12x - (x + 4)$, then what is the value of $5x$?

Part III: Evaluate Formulas

Find the value of each formula if $x = 2$, $y = 3$, $z = 4$ and $R = 5$.

1) $F = 3 (R - y + 1)$

2) $R^2 - y^2 - xz = A$

3) $L = 3R - 2 (y^2 - x)$

Part IV: Rearranging Functions

Solve each equation for the indicated variable.

1) $A = \dfrac{1}{2}bh$ for h

2) $P = 2\ell + 2w$ for w

3) $S = 4\pi r^2$ for r

Part V: Scientific Notation

Rewrite each expression in standard from.

1) 7.35×10^6

2) 9.41×10^{-8}

Rewrite each expression in scientific notation.

3) 0.2984000

4) 49293000000

Simplify each expression. Leave answers in scientific notation.

5) $\left(4.3 \times 10^7\right) \times \left(1.7 \times 10^{-2}\right)$

6) $\dfrac{9.2 \times 10^{13}}{2.7 \times 10^5}$

Part VI: Radicals

Rules for Simplifying Radicals:

1) No perfect square factors under the radicand $\left(\sqrt{}\right)$

2) No fractions under the radicand

3) No radicals in the denominator of a fraction
   (if so, must RATIONALIZE – multiply radical in denominator by both the numerator and the denominator of the original fraction)

4) Product Property: $\quad \sqrt{ab} = \sqrt{a} \times \sqrt{b}$

5) Quotient Property: $\quad \sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$

6) When adding/subtracting radicals, may only combine like radicals

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Simplify each expression

1) $\sqrt{169}$

2) $\sqrt{20}$

3) $\sqrt{405}$

4) $\sqrt{\dfrac{144}{225}}$

5) $5\sqrt{2} \times 3\sqrt{8}$

6) $2\sqrt{6} \times 3\sqrt{10}$

7) $3\sqrt{12} + 2\sqrt{3}$

8) $2\sqrt{98} + \sqrt{2} - 6\sqrt{72}$

9) $\sqrt{\dfrac{2}{3}}$

Part VII: Graphing Linear Equations

- To graph a linear equation, write the equation in the form y= mx + b (slope-intercept form)
  If given in *standard form Ax+By=C*, rather than slope-intercept form, then must "solve for y" first!

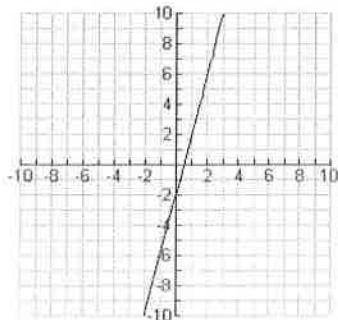 (x, y) = points on the line   m = slope (rise/run)   b= y-intercept (where the line intersects the y-axis)

  Plot the y-intercept (b) and from this point use the slope to plot the second point to create a line.

  Example: Graph y = 4x - 2
           y-intercept (b) = -2
           Slope = 4 or 4/1 (go up 4 units and to the right 1 unit)

IMPORTANT: If there is not a "b", such as y = 2x, then the line intersects the y-axis at the origin (0, 0)
               Horizontal lines are written in the form y = 2 and y = -5   (slope = 0)
               Vertical lines are written in the form x = 2 and x = -5   (slope is undefined)
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Graph each equation.

1)   x = 2

2)   y = -3

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

4)   y = 3x -1

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

6)   4x + 2y = -8

7)   3x - y = -2

8)   5x + 2y = 6

Part VIII: Slope and Writing Equations of Lines   (y = mx + b)

   A.   Slope Formula $\frac{y_2 - y_1}{x_2 - x_1}$

        Horizontal lines have a slope of zero; Vertical lines have no slope (undefined)

        Example: Find the slope of a line containing point (10, 4) and (-5, 9)

        $m = \frac{9 - 4}{-5 - 10} = \frac{5}{-15} = -\frac{1}{3}$

   B.   Write an equation given **slope** and **y-intercept**

        Example: Write the equation of a line if the slope is 2 and the y-intercept is 3
                 y = 2x + 3   (m = slope and b = y-intercept)

   C.   Write an equation given **slope** and **a point** on the line

        Example: Write the equation of a line that has a slope of ½ and contains point (-8, 1)
             a) Use y= mx + b (Slope-Intercept form)   b) Use y – y₁ = m (x – x₁)   (Point-Slope form)
                Substitute ½ for m and (-8, 1) for x & y   OR   Substitute ½ for m and (-8, 1) for x₁ & y₁
                Solve for b and write the equation
                   1 = ½ (-8) + b   y – 1 = ½ (x – -8)
                   1 = -4 + b   y – 1 = ½ x + 4
                   5 = b   y = ½ x + 5
                   y = ½ x + 5

   D.   Write the equation of a line given **2 points**

        Example: Write the equation of a line that passes through (3, 4) and (2, 6)
             a) Find the slope of the line using slope formula   m = -2
             b) Choose one of the points and use either Slope-Intercept form or Point-Slope form to write the equation
                     Slope Intercept Form: Point-Slope Form
                        4 = (-2)(3) + b   y – 4 = -2 (x -3)
                        4 = -6 + b   y – 4 = -2x + 6
                        10 = b   y = -2x + 10
                        y = -2x + 10

   E.   Write the equation of a line given the **x-intercept and a point** on the line.
        The x-intercept is a "point" where the line intersects the x-axis
        Rewrite the x-intercept as an ordered pair and then write the equation as you would if given 2 points

        Example: Write the equation of a line with an x-intercept 2 and passes through (4, -5)
             a) Rewrite the x-intercept as (2, 0) and then find the slope of the line
             b) Write the equation using slope-intercept or point-slope form. Use the slope and the coordinates of 1 point.
                     Slope-intercept Form: Point-Slope Form
                        0 = - 5/2 (2) + b   y – 0 = -5/2 (x -2)
                        0 = -5 + b   y = -5/2x + 5
                        5 = b
                        y = -5/2 x + 5

F. Write the equation of a line that is **parallel or perpendicular to the line**

· Parallel lines have the same slope
    $y = 3x + 2$, $y = 3x -6$, $y = 3x -2$ (all slopes equal 3)

· Perpendicular lines have slopes that are the negative reciprocals of each other
    $y = -2x + 5$ and $y = \frac{1}{2} x + 10$ (-2 and $\frac{1}{2}$ are negative reciprocals of each other)

Example: Write the equation of a line parallel to $y = -2x + 6$ and passes through the point (2, 3).
    If parallel, the slopes are the same, so m = -2. Next, use the point (2, 3) and slope -2 to write an equation using either point-slope or slope-intercept form.

Slope-Intercept Form	Point-Slope Form
$3 = -2 (2) + b$	$y - 3 = -2 (x - 2)$
$7 = b$	$y - 3 = -2x +4$
$y = -2x + 7$	$y = -2x + 7$

** To write the equation of a line perpendicular to $y = -2x + 6$ and passes through point (2, 3), find the negative reciprocal of the slope and do the same as above. The slope is -2, so the negative reciprocal is $\frac{1}{2}$. Use $\frac{1}{2}$ as the slope and (2,3) as x and y. The equation would be $y = \frac{1}{2}x + 2$.

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Find the slope of the line containing each pair of points

1)   (6,-4) to (3, -8)   2)   (-5, 3) and (-5, 6)   3)   (-5, 12) and (3, -12)

Use the given information to write a linear equation.

4)   slope = - 2   y-intercept is 7   5)   slope = 3   y-intercept is 0

6)   slope= -5/6   contains the point (6, -9)   7)   slope = -4   contains the point (1, -3)

8)   A horizontal line that contains the point (4, 7)   9)   Contains points (4, -4) and (-7, -4)

Name: _____

Part I - Simplifying Expressions

1.	2.
3.	4.

Part II - Solving Equations and Inequalities

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.
13.	14.	15.
16.	17.	18.

Part III – Evaluate Formulas

1.	2.	3.

Part IV – Rearranging Functions

1.	2.	3.

Part V – Scientific Notation

1.	2.	3.
4.	5.	6.

Part VI – Radicals

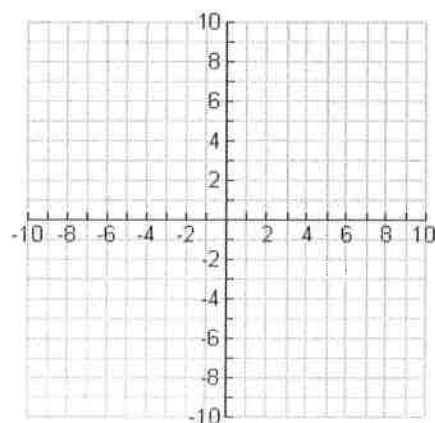|		
1.	2.	3.
4.	5.	6.
7.	8.	9.

Part VII – Graphing Linear Equations

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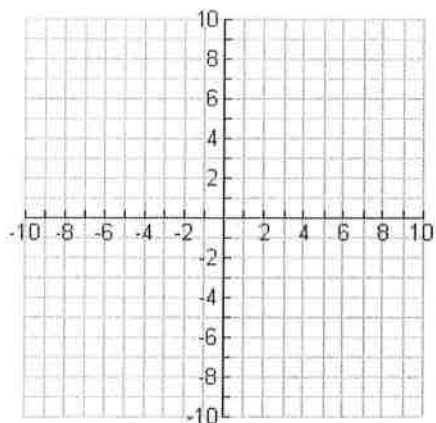
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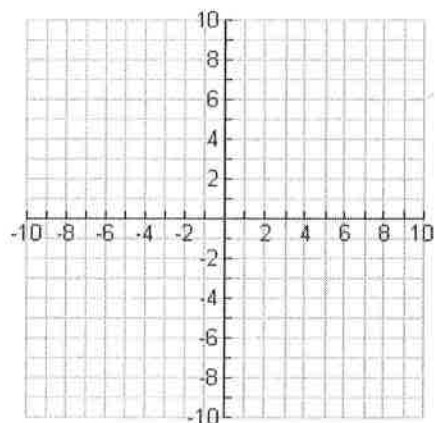
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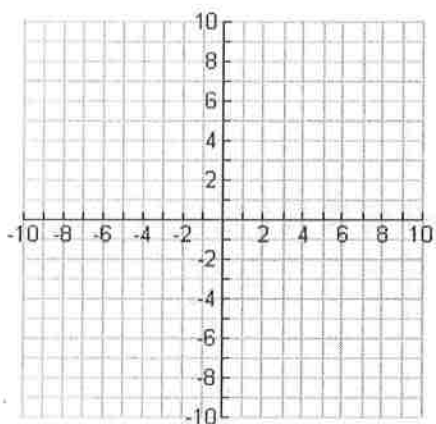
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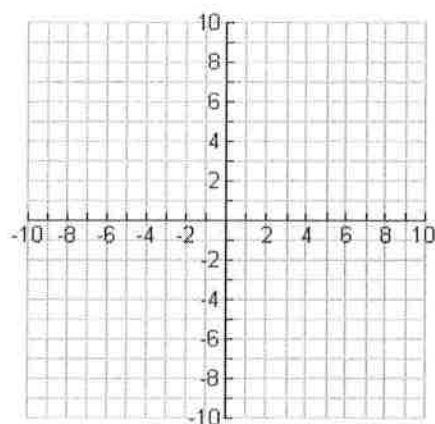
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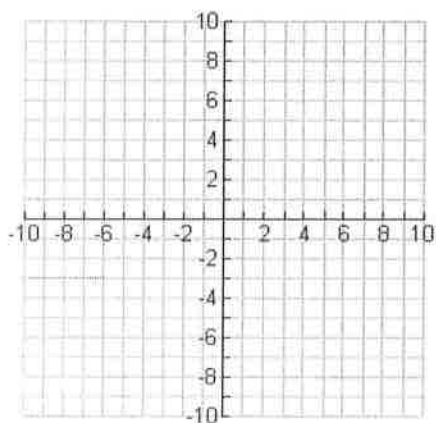
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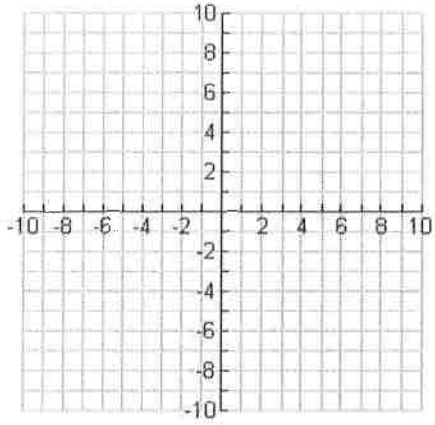
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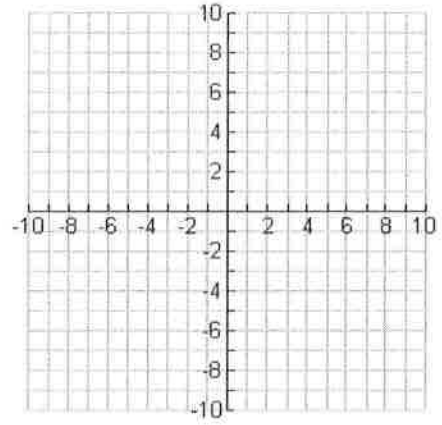
Part VIII - Slope and Writing Equations of Lines $(y = mx + b)$		
1.	2.	3.
4.	5.	6.
7.	8.	9.