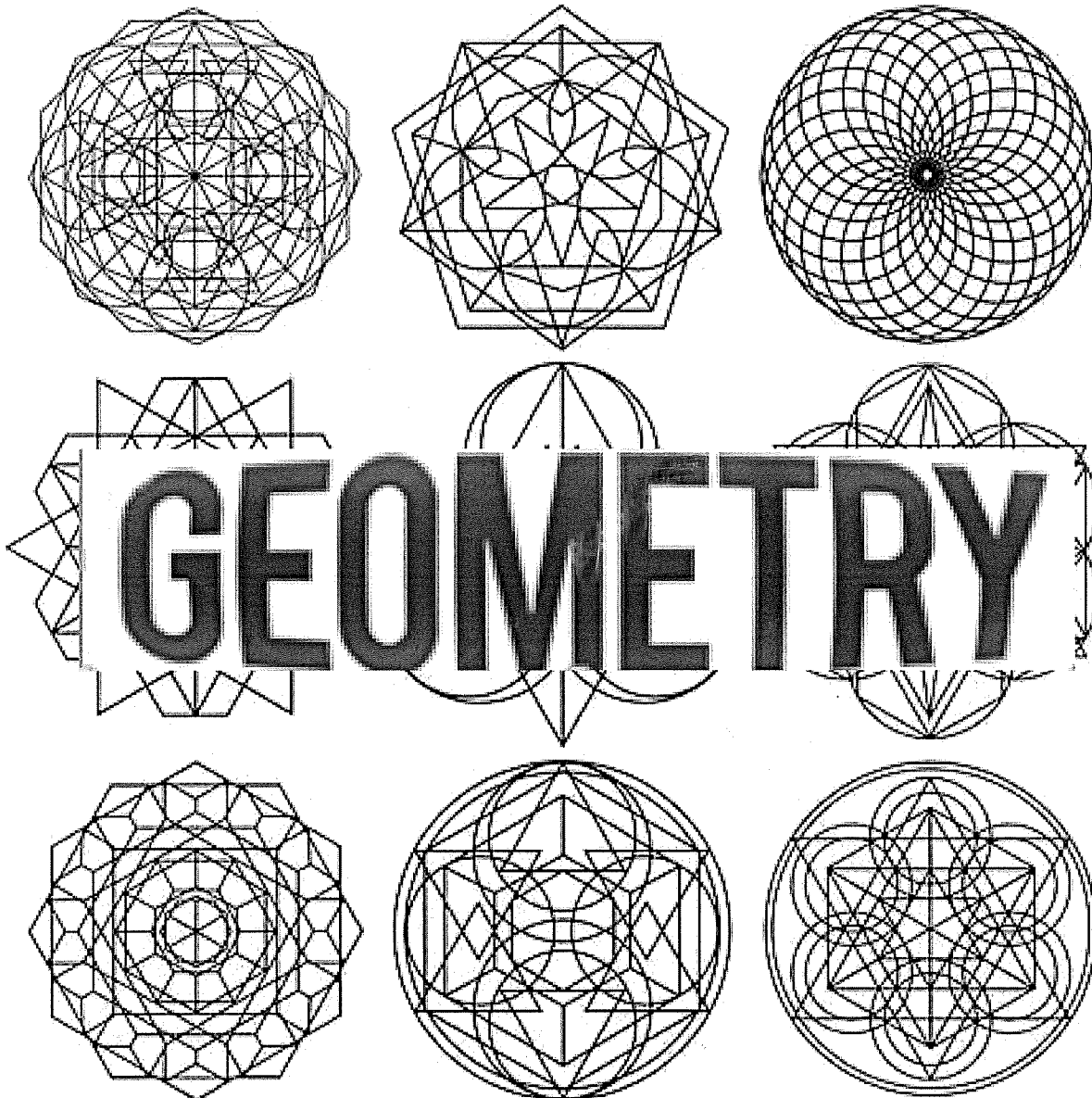


INCOMING CP GEOMETRY
SUMMER REVIEW PACKET

2019



Due Date: Friday, September 6th

Attached is your summer review packet for

College Prep Geometry

You must show work in order to receive credit. This means if you typed something into a calculator to solve it, you must write what you typed so I know how you found your answers.

The problems are on the work you have covered this year in Algebra 1. Use your old notes to help you.

You don't remember how to do something? You lost your notes?

Use [khanacademy.com](https://www.khanacademy.com) to watch a video to help you.

No calculator?? No problem.

Desmos

Use this free online graphing calculator and app for your phone.

If you need more room, attach any papers with work on them with the problem numbered. Do a few problems each day and you will have this completed in no time at all.

This assignment will earn you extra credit for marking period 1.

Objectives for Geometry Summer Packet

I. Finding the Equation of a Line (Problems: #1- 8)

- Given a point that lies on that line and the y-intercept
- Given a point and a parallel line
- Graphing using the slope-intercept form

II. Solving Equations (Problems: #9-18)

- Solving equations with variables on both sides
- Using order of operations
- Using properties of equality
- Solving inequalities
- Solving literal equations
- Solving absolute value equations

III. The slope formula (Problems: #19-21)

- Use the counting method to find the slope of a line.
- Use the slope formula to find slope of a line.

IV. Systems of Equations (Problems: #22-24)

- Using the linear combination method to solve systems of equations
- Using the substitution method to solve systems of equations

V. Proportions (Problems: #25-26)

- Solving proportions by cross multiplying

VI. Radicals (Problems: #27-36)

- Simplifying radicals
- Squaring radicals
- Rationalizing radicals

VII. Scale Factor and Ratios (Problems: #37-38)

- Scale factor
- Simplifying Ratios

VII. Factoring (Problems: #39-42)

- Solving quadratic equations by taking the square root of both sides
- Using properties of equality
- Multiplying binomials (FOIL)

VIII. The Pythagorean Theorem (Problems: #43-45)

- Using the Pythagorean theorem to find missing lengths in right triangles
- Using properties of equality

IX. Polynomials (Problems: #46 - 48)

- Simplifying polynomials

X. Quadratic Equations (Problems: #49-50)

- Solving quadratic equations by taking the square root of both sides
- Using properties of equality

XI. Distance Formula (Problems: #51-54)

- Use the distance formula to find the distance between two points
- Solving equations involving radicals

XII. The Midpoint Formula (Problems: #55-57)

- Identifying the x coordinate and the y coordinate in an ordered pair
- Using the midpoint formula to find the midpoint of two points

ALGEBRA REVIEW

Finding the Equation of a Line

Example: Find an equation of the line, in slope intercept form, that passes through the point (3, 4) and has a y-intercept of 5.

$$y = mx + b \quad \text{Write the slope-intercept form.}$$

$$4 = 3m + 5 \quad \text{Substitute 5 for b, 3 for x, and 4 for y.}$$

$$-1 = 3m \quad \text{Subtract 5 from each side.}$$

$$-\frac{1}{3} = m \quad \text{Divide each side by 3.}$$

The slope is $m = -\frac{1}{3}$. The equation of the line is $y = -\frac{1}{3}x + 5$.

The slope of the parallel line is $-\frac{1}{3}$.

Write the equation of the line, in slope intercept form, that passes through the given point and has the given y-intercept.

1. (2, 1); b = 5 _____ 2. (7, 0); b = 13 _____

3. (-2, -1); b = -5 _____

4. Write the equation of a line that passes through (5, 1) and is parallel to $y = \frac{3}{5}x - 4$. (Hint: use the slope-intercept form to solve for b this time)

4. _____

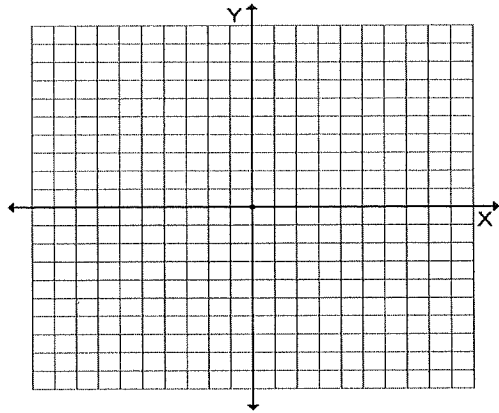
Graphing Linear equations

To graph a linear equation use the slope(m) and y intercept(b). First graph the b then count the slope up and over or down and over (if negative slope) (remember it has to be in slope-intercept form first- solve for y!!)

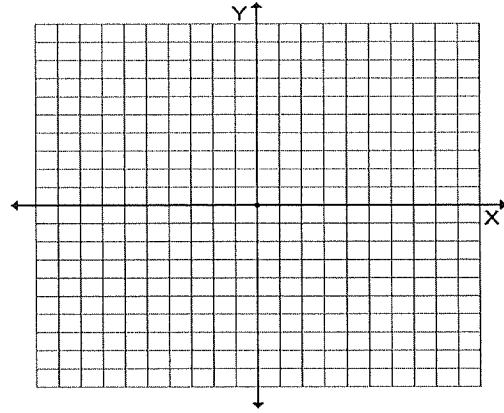
For example :

$y = \frac{2}{3}x - 3$, you would plot a point at -3 on the y-axis then count up 2 and over to the right 3 units to plot another point, and connect the dots to make the line.

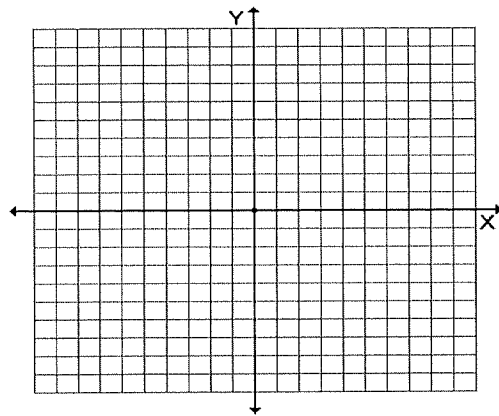
5. Graph $y = \frac{1}{2}x + 1$



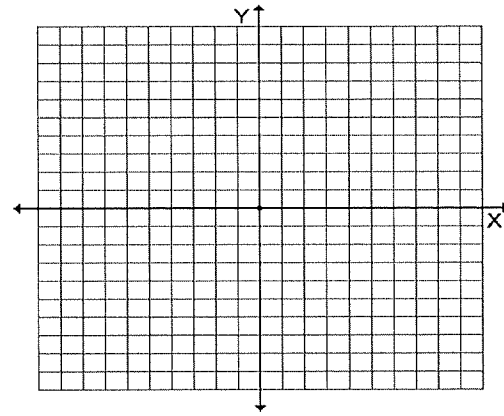
6. Graph $y = -\frac{2}{5}x - 4$



7. Graph $y = 2x - 1$



8. Graph $3x + 4y = 4$



Solving Equations with Variables on Both Sides

Examples:

a. $6a - 12 = 5a + 9$

$a - 12 = 9$ Subtract $5a$ from each side.

$a = 21$ Add 12 to each side.

b. $6(x + 4) + 12 = 5(x + 3) + 7$

$6x + 24 + 12 = 5x + 15 + 7$

$6x + 36 = 5x + 22$

$x = -14$

Solve the equation.

9. $3x + 5 = 2x + 11$ _____ 10. $54c - 108 = 60c$ _____

11. $\frac{x + 6}{2} = 9$ _____

12. $4x + 2(x - 3) = 0$ _____

Solving Inequalities.

Examples:

Solve like an equation.

a. $3y + 1 > y - 3$

$2y + 1 > -3$ Subtract y from both sides

$2y > -4$ Subtract 1 from both sides

$y > -2$ Divide by 2

b. $4x + 3 < 8x + 15$

$-4x + 3 > 15$ subtract $8x$ from both sides

$-4x > 12$ subtract 3 from both sides

$x < -3$ divide by -4 (need to flip symbol)

13. $3x + 2 < 2x + 5$

14. $4 - 5y \geq 8 - y$

13. _____

14. _____

Solving Literal Equations

Example:

$C = 2\pi r$ Solve for r

$r = \frac{C}{2\pi}$ Your goal is to isolate the variable by inverse operations.

15. Volume of a rectangular prism is $V = lwh$. Solve for h .

15. _____

16. Area of a square is $A = \pi r^2$. Solve for r.

16. _____

Solving absolute value equations.

Examples:

$|x| + 3 = 10$

$|x| = 7$ subtract 3 from both sides

$x = 7$ or $x = -7$ since the absolute value of 7 or -7 is 7.

17. $|x| - 8 = 10$

18. $|x| + 12 = 35$

17. _____

18. _____

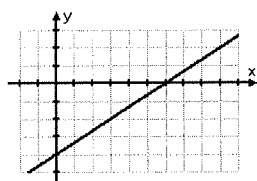
Slope of a line

Use the counting method to find the slope:

$\frac{\text{rise}(\text{change in } y\text{'s})}{\text{run}(\text{change in } x\text{'s})}$

Count to find the slope

19.



Use the slope formula:

$m = \frac{y_2 - y_1}{x_2 - x_1}$

19. _____

Use the slope formula to find the slope of a line passing through the points given.

20. (3, 2) (5, 6)

21. (8, 10) (-3, -12)

20. _____

21. _____

Solve the System of Equations:

Example 1: Linear Combination Method

$$\begin{aligned} 4x - 3y &= -5 \\ -4x + 2y &= -16 \end{aligned}$$

The goal is to obtain coefficients that are opposites for one of the variables.

$$\begin{aligned} 4x - 3y &= -5 \\ \underline{-4x + 2y} &= \underline{-16} \\ \hline -1y &= -21 \\ -1 & \quad -1 \\ \hline y &= 21 \end{aligned}$$

Substitute 21 for y: $4(21) - 3y = -5$. Solve to get $y = -1$. The solution is $(21, 89/3)$

Example 2: Substitution Method

$$\begin{aligned} 3x + 2y &= 16 \\ x + 3y &= 10 \longrightarrow x = 10 - 3y \end{aligned}$$

Now substitute $10 - 3y$ for x in the first equation: $3(10 - 3y) + 2y = 16$.
Solve for y to get $y = 2$.

Substitute 2 for y : $x = 10 - 3(2)$. Solve to get $x = 4$. The solution is $(4, 2)$.

22. $2x - 3y = -16$
 $y = 5x + 1$

23. $7x + 2y = 10$
 $-7x + y = -16$

24. $y = 4x - 8$
 $y = 2x + 10$

Solving Proportions

Examples: a. $\frac{x}{8} = \frac{3}{4}$ Cross Multiply b. $\frac{6}{x+4} = \frac{1}{9}$ Cross Multiply

$$\begin{aligned} 4x &= 8 \cdot 3 \\ 4x &= 24 \\ x &= 6 \end{aligned}$$
$$\begin{aligned} 6 \cdot 9 &= x + 4 \\ 54 &= x + 4 \\ 50 &= x \end{aligned}$$

Solve for the variable.

25. $\frac{x}{20} = \frac{1}{5}$ _____

26. $\frac{3w+6}{28} = \frac{3}{4}$ _____

Simplifying Radicals

Examples: a. $\sqrt{20} = \sqrt{4 \cdot 5}$
 $= 2\sqrt{5}$

b. $(3\sqrt{5})^2 = (3\sqrt{5})(3\sqrt{5})$
 $= 9\sqrt{25}$
 $= 9(5)$
 $= 45$

c. $\frac{6}{\sqrt{5}} = \frac{6}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$
 $= \frac{6\sqrt{5}}{\sqrt{5} \cdot \sqrt{5}}$
 $= \frac{6\sqrt{5}}{5}$

d. $3\sqrt{12} + 4\sqrt{3} = 6\sqrt{3} + 4\sqrt{3} = 10\sqrt{3}$ e. $\sqrt{27x^7} = 3x^3\sqrt{3x}$

Simplify the expression.

27. $\sqrt{45} =$ _____

28. $\sqrt{40} =$ _____

29. $(\sqrt{8})^2 =$ _____

30. $(6\sqrt{3})^2 =$ _____

31. $(5\sqrt{7})^2 =$ _____

32. $\frac{5}{\sqrt{3}} =$ _____

33. $\frac{4}{\sqrt{8}} =$ _____

34. $\sqrt{\frac{5}{20}} =$ _____

35. $\sqrt{20} - \sqrt{80} =$ _____

36. $\sqrt{325x^5y^8} =$ _____

Scale Factor:

Example: A map has a scale factor of 1in:15 mi, How far apart are two cities that are 5 inches apart?

Use a proportion $\frac{1in}{15mi} = \frac{5in}{xmi}$. Use cross products $1x = 15(5)$, $x = 75$ miles.

37. A map has a scale factor of 4in:23 mi, How far apart are two cities that are 6 inches apart?

37. _____

Simplifying Ratios

Example: What is the ratio of $25x^3$ and $75x$

$\frac{25x^3}{75x}$ write as a ratio first, then reduce $\frac{x^2}{3}$

38. What is the ratio of $28x^3y^5$ and $44x^2y$

38. _____

Factoring and multiplying binomials.

Examples: a. $x^2 - 5x - 14$

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

$$x - 7 = 0 \text{ or } x + 2 = 0$$

$$x = 7 \text{ or } x = -2$$

b. $(x + 3)(x - 5)$

$$= x^2 - 5x + 3x - 15 \text{ (FOIL)}$$

$$= x^2 - 2x - 15 \text{ (Simplify)}$$

Factor each polynomial:

39. $x^2 + 5x - 24$ _____

40. $x^2 - x - 20$ _____

41. $(x + 8)(x - 9) =$ _____

42. $(2x - 3)(x - 4) =$ _____

Polynomials

Example: Simplify the polynomial.

$$13x^2 + 2x - 4x + 15 - 3x - 9$$

$$13x^2 - 5x + 6$$

combine the x values
combine the constants

$$8y^2 + 12x - 3y + 9 - 3x - 9y$$

$$8y^2 + 9x - 12y + 9$$

combine similar terms

Simplify each expression.

46. $y - 4x + 16y^2 - 10x - 4y^2$ _____

47. $5m + 3n - 4mn - 10m - 8n$ _____

48. $12c^2 + 5b - 8c + 3b^2 + 6b - 8c^2$ _____

Solving Quadratic Equations

Example: $x^2 - 5 = 16$

$$x^2 = 21 \quad \text{Add 5 to both sides}$$

$$x = \pm\sqrt{21}$$

Exercises: Solve.

49. $4x^2 + 5 = 45$ _____ 50. $7x^2 = 252$ _____

Distance Formula

Example: Find the distance between the points $(-4, 3)$ and $(-7, 8)$.

$$\begin{aligned}\text{Formula: } d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ d &= \sqrt{(-7 - (-4))^2 + (8 - 3)^2} \\ d &= \sqrt{(-3)^2 + (5)^2} \\ d &= \sqrt{34}\end{aligned}$$

Exercises: Find the distance between the points.

51. $(3, 6), (0, -2)$ _____ 52. $(5, -2), (-6, 5)$ _____

53. $(-6, -6), (-3, -2)$ _____ 54. $(-8, 5), (-1, 1)$ _____

Midpoint Formula

Example: Find the midpoint between $(8, 14)$, $(2, 6)$.

$$\begin{aligned}\text{Formula: } & \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ & \left(\frac{8 + 2}{2}, \frac{14 + 6}{2} \right) \\ & \left(\frac{10}{2}, \frac{20}{2} \right) \\ & (5, 10)\end{aligned}$$

The midpoint is always an ordered pair!

Exercises: Find the midpoint between the given points.

55. $(-3, 5)$ and $(8, 9)$ _____

56. $(-7, -17)$ and $(11, 4)$ _____

57. $(3, -8)$ and $(-5, -13)$ _____