CP Geometry
Summer Packet
2018

Name: _____

Due Date: Friday, September 7th

Attached is your summer review packet for the **CP Geometry** course.

THIS IS YOUR FIRST GRADE.

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 the answers.

NO WORK = NO CREDIT (GRADED FOR CORRECTNESS)

The problems are on the work you've covered this year in Algebra 1. Use your old notes to help you, and if possible, the internet. (kahn academy, purple math, etc.)

"I didn't know how to do that one" will not get you credit.
Try something, even if it is wrong.

NOT HAVING A CALCULATOR IS NO EXCUSE FOR NOT COMPLETING A PROBLEM. FIND A WAY.

Desmos.com (free online/app graphing calculator

If you do not hand this packet in on September 7th, OR if there is no work with your answers, then you will receive a 0 as your first grade.
If you need more room, just attach any papers with work on them with problem numbers labeled.
If you attempt to complete this packet the night before it is due, you will most likely not finish, or not have all the work I'm asking for. I suggest you do a little at a time.
Good luck and have a great summer !

Objectives for Geometry Summer Packet
2017-2018

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	Write the slope-intercept form.
4 = 3m + 5	Substitute 5 for b, 3 for x, and 4 for y.
-1 = 3m	Subtract 5 from each side.
$-\frac{1}{3}$ = m	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. _____

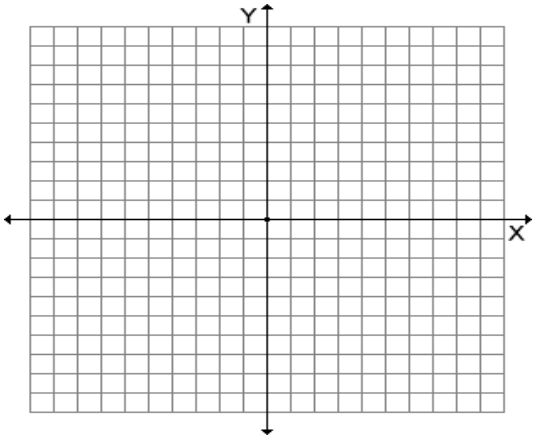
Graphing Linear equations

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!!)

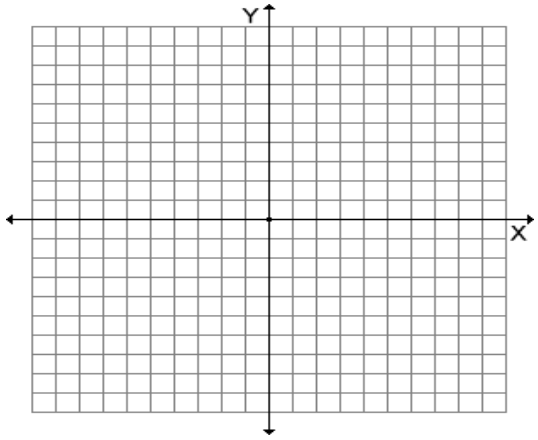
For example :

$y = \frac{2}{3}x - 3$, 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.

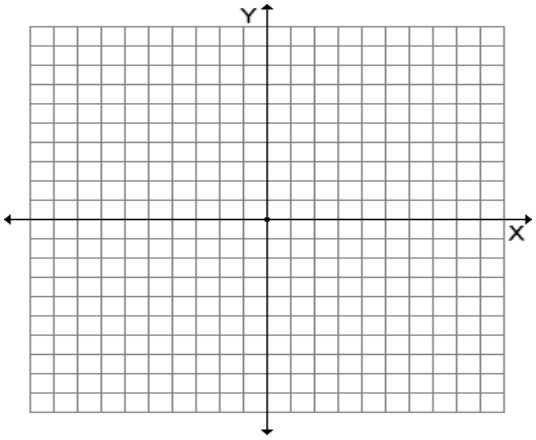
5. Graph $y = \frac{1}{2}x + 1$



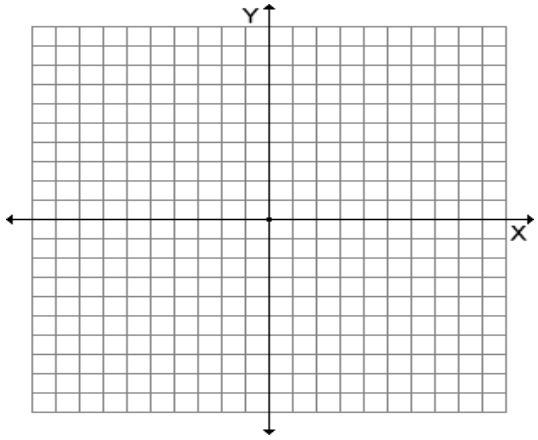
6. Graph $y = -\frac{2}{5}x - 4$



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 = πr^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. _____

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Slope of a line

Use the counting method to find the slope:

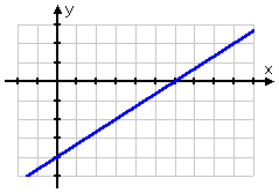
$\frac{rise(\text{change in y's})}{run(change\ in\ x\text{'s})}$

Use the slope formula:

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

Count to find the slope

19.



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

$4x - 3y = -5$

$-4x + 2y = -16$

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

$4x - 3y = -5$

$-4x + 2y = -16$

$\frac{-1y}{-1} = \frac{-21}{-1}$

$y = 21$

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

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Example 2: Substitution Method

$3x + 2y = 16$

$x + 3y = 10 \longrightarrow x = 10 - 3y$

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).

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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

$4x = 8 \cdot 3$

$4x = 24$

$x = 6$

b. $\frac{6}{x+4} = \frac{1}{9}$ Cross Multiply

$6 \cdot 9 = x + 4$

$54 = x + 4$

$50 = x$

Solve for the variable.

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

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

Simplifying Radicals

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

$= 2\sqrt{5}$

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 $\frac{1in}{15mi} = \frac{5in}{x\,mi}$. 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. _____

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Factoring and multiplying binomials.

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

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

$x - 7 = 0$ or $x + 2 = 0$

$x = 7$ or $x = -2$

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

$= x^2 - 5x + 3x - 15$ (FOIL)

$= x^2 - 2x - 15$ (Simplify)

Factor each polynomial:

39. $x^2 + 5x - 24$ _____ 40. $x^2 - x - 20$ _____

41. $(x + 8)(x - 9)$ = _____ 42. $(2x - 3)(x - 4)$ = _____

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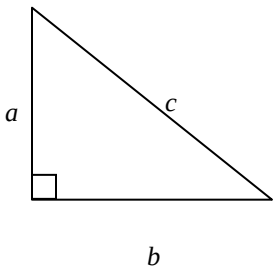
Pythagorean Theorem:

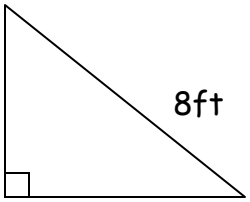
Examples: a. a = 12,b = 35, c = _____ b. a = 10, b = _____, c = 26



$a^2 + b^2 = c^2$
$(12)^2 + (35)^2 = c^2$
$144 + 1225 = c^2$
$1369 = c^2$
$\sqrt{1369} = c$
$37 = c$

$a^2 + b^2 = c^2$
$(10)^2 + b^2 = (26)^2$
$100 + b^2 = 676$
$b^2 = 576$
$b = \sqrt{576}$
$b = 24$

c. A man leans a 8 ft. ladder against a house. The base of the ladder is 2ft from the house. To the nearest tenth how high on the house does the ladder reach?



Use Pythagorean's theorem
$x^2 + 2^2 = 8^2$
$x^2 + 4 = 64$
$x^2 = 60$
$x \approx 7.7$ ft

Use the triangle above. Find the length of the missing side. Round answers to the nearest tenth.

43. a = 36, b = 15, c = _____ 44. a = 17, b = _____, c = 49

45. A man leans a 12 ft. ladder against a house. The base of the ladder is 4 ft. from the house. To the nearest tenth how high on the house does the ladder reach?

45. _____

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

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Solving Quadratic Equations

Example: $x^2 - 5 = 16$

$x^2 = 21$ 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).

Formula: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = \sqrt{(-7 - (-4))^2 + (8 - 3)^2}$

$d = \sqrt{(-3)^2 + (5)^2}$

$d = \sqrt{34}$

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).

Formula: $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

$(\frac{8+2}{2}, \frac{14+6}{2})$

$(\frac{10}{2}, \frac{20}{2})$

$(5,10)$

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)_____