INCOMING HONORS GEOMETRY SUMMER REVIEW PACKET 2019

Due Date: Friday, September 6th

Attached is your summer review packet for

Honors 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 **kahnacademy.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 Honors 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 two points that lie on that line

II. Distance Formula (Problems: #9-12)
- Use the distance formula to find the distance between two points
- Solving equations involving radicals

III. Solving Equations (Problems: #13-20)
- Solving equations with variables on both sides
- Using order of operations
- Using properties of equality

IV. Systems of Equations (Problems: #21-25)
- Using the linear combination method to solve systems of equations
- Using the substitution method to solve systems of equations

V. Radicals (Problems: #26-35)
- Simplifying radicals
- Squaring radicals
- Rationalizing radicals

VI. Proportions (Problems: #36-39)
- Solving proportions by cross multiplying
- Solving proportions using equivalent fractions
- Solving equations involving inverse operations

VII. Quadratic Equations (Problems: #40-41)
- Solving quadratic equations by taking the square root of both sides
- Using properties of equality
- Solving quadratic equations by factoring (Problems: # 51 - 60)

VIII. The Pythagorean Theorem (Problems: #44-47)
- Using the Pythagorean theorem to find missing lengths in right triangles
- Using properties of equality

IX. The Midpoint Formula (Problems: #48-50)
- 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 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 $y=-\frac{1}{3}x+5$.

Exercises: Write the equation of the line that passes through the given point and has the given y-intercept.

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

3. (-11, 8); b = -14 _____ 4. (-2, -1); b = -5 _____

Finding the Equation of a Line

Example: Write an equation of the line that passes through the points (4, 8) and (3, 1).

Find the slope of the line.

$m = \frac{1-8}{3-4}$ Substitute values.

$m = \frac{-7}{-1} = 7$ Simplify.

1 = 7(3) + b Substitute values into y = mx + b

1= 21 + b Multiply.

-20 = b Solve for b.

The equation of the line is y = 7x - 20.

Alternative Method:

Find the slope of the line. m = 7

Set up a proportion using the slope and one point on the line.

$\frac{7}{1} = \frac{y-8}{x-4}$

Cross-multiply. 7(x -4) = 1(y - 8)

Distribute 7x - 28 = y - 8

Place in standard form. 7x - y = 20

Exercises: Write an equation of the line that passes through the given points.

5. (6, 3), (1, 2) _____

6. (-2, 4), (3, -6) _____

7. (6, -2), (0, 4) _____

8. (10, -9), (14, -1) _____

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.

9. (3, 6), (0, -2) _____ 10. (5, -2), (-6, 5) _____

11. (-6, -6), (-3, -2) _____ 12. (-8, 5), (-1, 1) _____

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

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

$6x + 36 = 5x + 22$

$x = -14$

Exercises: Solve the equation.

13. $3x + 5 = 2x + 11$ _____

14. $y - 18 = 6y + 7$ _____

15. $-2t + 10 = -t$ _____

16. $60c - 54(c - 2) = 0$ _____

17. $-\frac{1}{2}(16-2h)=11$ _____

18. $1 + j = 2(2j + 1)$ _____

19. $4x + 2(x - 3) = 0$ _____

20. $\frac{3+m}{2}=5$ _____

Solve the System of Equations:

Example 1: Linear Combination Method

$4x - 3y = -5$

$7x + 2y = -16$

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

$4x - 3y = -5$ Multiply by 2 $\longrightarrow$ $8x - 6y = -10$

$7x + 2y = -16$ Multiply by 3 $\longrightarrow$ $21x + 6y = -48$

$29x = -58$

$x = -2$

Substitute -2 for x: $4(-2) - 3y = -5$. Solve to get $y = -1$. The solution is $(-2, -1)$

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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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21. $2x - 3y = -16$
    $y = 5x + 1$

22. $x + y = 8$
    $2x + 5y = 3$

23. $9x + 4y = 3$
    $x + 8y = 6$

24. $4x - 5y = 18$
    $3x + 10y = -3$

25. $8x + y = -8$
    $-2x - 3y = 35$

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

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

$= \frac{6\sqrt{5}}{5}$

Exercises: Simplify the expression.

26. $\sqrt{45}$ = _____

27. $\sqrt{40}$ = _____

28. $\sqrt{288}$ = _____

29. $\sqrt{52}$ = _____

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

31. $(6\sqrt{3})^2$ = _____

32. $(5\sqrt{7})^2$ = _____

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

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

35. $\frac{3\sqrt{5}}{\sqrt{20}}$ = _____

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

$6 \cdot 9 = x + 4$

$54 = x + 4$

$50 = x$

Exercises: Solve.

36. $\frac{x}{20}=\frac{1}{5}$ _____ 37. $\frac{6}{19}=\frac{m}{95}$ _____

38. $\frac{3w+6}{28}=\frac{3}{4}$ _____ 39. $\frac{3}{p-6}=\frac{1}{p}$ _____

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Solving Quadratic Equations

Example: $x^2 - 5 = 16$

$x^2 = 21$ Add 5 to both sides

$x = \pm\sqrt{21}$

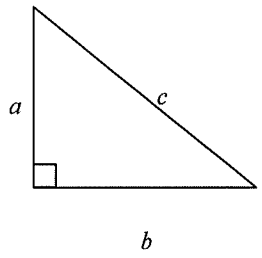
Exercises: Solve.

40. $x^2 + 3 = 13$ _____ 41. $7x^2 = 252$ _____

42. $4x^2 + 5 = 45$ _____ 43. $11x^2 + 4 = 48$ _____

Pythagorean Theorem:

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



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

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

Exercises: Use the triangle above. Find the length of the missing side.

44. a = 36, b = 15, c = _____

45. a = 17, b = _____, c = 49

46. a = _____, b = 13, c = 24

47. a = 19, b = 45, c = _____

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.

48. (-3, 5) and (8, 9) _____

49. (-7, -17) and (11, 4)_____

50. (3, -8) and (-5, -13)_____

Solving quadratic equations by factoring

Example: Solve $2x^2 - x = 3$

$2x^2 - x - 3 = 0$	set equation equal to zero
$(2x - 3)(x + 1) = 0$	Factor
$2x - 3 = 0$ or $x + 1 = 0$	set both equal to zero
$X = \frac{3}{2}$ or $x = -1$	solve for x

$\left\{\frac{3}{2}, -1\right\}$ are the solutions

Solve by factoring

51. $x^2 + 7x + 10 = 0$ _____

52. $x^2 - x = 12$ _____

53. $x^2 - 6x = -8$ _____

54. $2x^2 + 5x + 3 = 0$ _____

55. $3x^2 + 2x - 8 = 0$ _____

56. $x^2 - 3x - 28 - 0$ _____

57. $2x^2 - x - 10 = 0$ _____

58. $6x^2 + 2x = 4$ _____

59. $2x^2 - 6x = 0$ _____

60. $x^2 + 7x = 0$ _____