



## Honors Geometry Summer Support Packet

The FRHSD *Honors Geometry* curriculum incorporates Algebra 1 standards when appropriate and are listed below specifically by unit. All students enrolled in Honors Geometry will be supported by completing the work in this packet. The work in this packet is preparatory for the algebraic standards incorporated in *Honors Geometry*. The support packet is not a required assignment.

### DIRECTIONS

As you complete this practice packet there are supporting materials linked below to help you solve the problems. The supporting sites offer additional supplemental problems as well. We encourage you to take advantage of the video tutorials as needed. The free resources listed below can be used if you need additional help. Search for the topics identified in bold/underline for each set of numbered practice problems. An answer key is included at the end of the packet.

### Free Resources:

- [Big Ideas Algebra 1](#) \*Free access to our FRHSD Algebra 1 Textbook
- [Khan Academy Algebra 1](#) \*Free video & lesson tutorials per topic
- [Study Pug](#) \*Free practice/lessons video tutorials (select free)
- [IXL Algebra 1](#)
- [NY Engage Algebra 1 Modules](#)

### #1 Identifying Squares from 1 to 20.

1. Complete.

$1^2 =$	$2^2 =$	$3^2 =$	$4^2 =$	$5^2 =$	$6^2 =$	$7^2 =$	$8^2 =$	$9^2 =$	$10^2 =$
$11^2 =$	$12^2 =$	$13^2 =$	$14^2 =$	$15^2 =$	$16^2 =$	$17^2 =$	$18^2 =$	$19^2 =$	$20^2 =$

### #2 - 6 Simplifying Expressions with Operations and Properties of Square Roots

2.  $\sqrt{289}$
3.  $\sqrt{128}$
4.  $\frac{\sqrt{30}\sqrt{18}}{3}$
5.  $\sqrt{500} - \sqrt{180} + \sqrt{80}$
6. The perimeter of a rectangle is  $20 + 4\sqrt{3}$  cm. If the length of the rectangle is  $2 + \sqrt{3}$  cm, what is the width?



## Honors Geometry Summer Support Packet

### #7 - 9 Simplifying Linear Expressions using the Distributive Property

7.  $5(13x - 15)$

8.  $\frac{5}{6}(7 + 3x)$

9.  $9(2x - 11) - (5x - 11)$

### #10 - 16 Adding, Subtracting, & Multiplying Polynomials

10.  $(5x^2 + 2x - 1) + (3x^2 - 8x - 9)$

11.  $(2x^2 - 7x - 5) - (3x^2 + 11x - 4)$

12.  $\frac{3}{5}(5x - 1) - 7(x - 4)$

13.  $(3x - 1)(5x + 7)$

14.  $(2x - 5)^2$

15.  $(2x - 5)(2x + 5)$

16.  $(7x - 2)(x^2 + 3x - 5)$

### #17 - 20 Factoring Quadratic Expressions Completely

17.  $m^2 - 7m - 30$

18.  $4p^2 - 6p - 4$

19.  $10y^2 + 19y + 6$

20.  $20k^2 - 125$



## Honors Geometry Summer Support Packet

### #21- 34 Solving Linear and Quadratic Equations

21.  $3x - 7 = 0$

22.  $17 - 4x = 27$

23.  $3(5x - 1) = 12$

24.  $\frac{1}{2}x^2 = 18$

25.  $3x^2 - 48 = 0$

26.  $(x - 5)^2 = 4x^2$

27.  $2x(x - 4) = 2(x^2 - 6x - 8)$

28.  $-10 + 2x + 3(5 - x) = \frac{1}{2}(4x - 8)$

29.  $\frac{3}{4}(24 - 8b) = 2(5b + 1)$

30.  $4.21x + 5.39 = 12.07(2.01 - 4.72x)$

31.  $(y + 6)(4y - 5) = 0$

32.  $n^2 - 11n + 18 = 0$

33.  $7x^2 + 5x + 8 = 10$

34. The area of a rectangle is given by  $12x^2 + 5x - 2$ . One side has a length of  $4x - 1$ . Find the width of the rectangle.

### #35 - 36 Solving for k

35.  $x^2 - 4x + k = (x - 2)^2$

36.  $x^2 + 6x + k = (x + 3)^2$



## Honors Geometry Summer Support Packet

### #37-38 Writing Equations to Represent 2-D and 3-D figures

37. The length of a rectangle is 2 feet more than twice the width. The perimeter is 34 feet. Write an equation and solve for the dimensions of the rectangle.
38. If the dimensions (length, width, and height) of a rectangular prism are  $(x + 2)$ ,  $(x + 1)$ , and  $(2x - 1)$ , then how would you represent the volume of the prism?

### #39 - 46 Writing Linear Equations

39. Determine the slope of the line passing through  $(5, -6)$  and  $(3, -6)$
40. Find the value of  $y$  so that the line passing through  $(2, 6)$  and  $(1, y)$  has a slope of 5.
41. What is the slope of the line whose equation is  $4x + 3y = 15$
42. Write the slope-intercept form of the equation of the line that passes through the points  $(4, 8)$  and  $(2, -10)$ .
43. Write the slope-intercept form of the equation of the line that has the slope  $4/3$  and passes through the point  $(0, 6)$
44. Write the standard form of the equation of the line that has the slope  $-3/2$  and passes through the point  $(2, 4)$
45. Write the equation of a vertical line that passes through the point  $(4, 9)$
46. Write the equation of a horizontal line that passes through the point  $(-3, 7)$ .

### #47 - 50 Solving Literal Equations

47. If the formula for the perimeter of a rectangle is  $P = 2l + 2w$ , then solve for  $w$  in terms of  $P$  and  $l$ .
48. The equation for the volume of a cylinder is  $V = \pi r^2 h$ . Solve for the positive value of  $r$ , in terms of  $h$  and  $V$ .
49. The equation for the volume of a cone is  $V = \frac{1}{3} \pi r^2 h$ . Solve for the positive value of  $r$ , in terms of  $h$  and  $V$ .
50. The formula for the volume of a pyramid is  $V = \frac{1}{3} B h$ . What is  $h$  expressed in terms of  $B$  and  $V$ ?



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### REFLECTION:

1. Which problems were you most confident were correct before looking at the answer key? Were they correct?
2. For the questions that weren't correct at first, were there parts of your work that you did correctly and what were they? (Be specific).
3. How long did it take you to complete this packet?
4. Which of the problems above were entirely new concepts?
5. Which of the problems above were the most challenging?
6. How did you move through those challenges?
7. If given the opportunity, one thing I would change about this assignment is ....
8. Explain what you're most proud of in this packet.
9. Which problems, if any, would you like a teacher to review with you?
10. Which problems, if any, would you like more practice on?



## **Honors Geometry Summer Support Packet**

### **SUPPORTING HONORS-ONLY ALGEBRAIC NJSLS-M**

#### **UNIT 1**

A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.\*

A.APR.A.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A.REI.B.4 Solve quadratic equations in one variable.

A-CED.A.2\* Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

#### **UNIT 2**

A.APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

#### **UNIT 3**

F-BF.A.1.b\*[1] Combine two functions using the operations of addition, subtraction, multiplication, and division. (\*Noting square root as a function\*)

A-SSE.A.1 Interpret expressions that represent a quantity in terms of its content.

A-SSE.A.2 Use the structure of an expression to identify ways to rewrite it. \*For the proof of the Law of Cosines.

A-CED.A.2\* Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A-CED.A.4 \* Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law  $V = IR$  to highlight resistance  $R$ .

#### **UNIT 4**

A.REI.B.4.A Use the method of completing the square to transform any quadratic equation in  $x$  into an equation of the form  $(x - p)^2 = q$  that has the same solutions. Derive the quadratic formula from this form.

A.REI.B.4.B Solve quadratic equations by inspection (e.g., for  $x^2 = 49$ ), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as  $a \pm bi$  for real numbers  $a$  and  $b$ .

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law  $V = IR$  to highlight resistance  $R$ .

#### **UNIT 5**

A.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law  $V = IR$  to highlight resistance  $R$ .



## Honors Geometry Summer Support Packet

### \*\*\* ANSWER KEY \*\*\*

#### #1 Identifying Squares from 1 to 20.

1. Complete.

$1^2 = 1$	$2^2 = 4$	$3^2 = 9$	$4^2 = 16$	$5^2 = 25$	$6^2 = 36$	$7^2 = 49$	$8^2 = 64$	$9^2 = 81$	$10^2 = 100$
$11^2 =$ 121	$12^2 =$ 144	$13^2 =$ 169	$14^2 =$ 196	$15^2 =$ 225	$16^2 =$ 256	$17^2 =$ 289	$18^2 =$ 324	$19^2 =$ 361	$20^2 =$ 400

#### #2 - 6 Simplifying Expressions with Operations and Properties of Square Roots

2.  $\sqrt{289} = 17$

3.  $\sqrt{128} = 8\sqrt{2}$

4.  $\frac{\sqrt{30}\sqrt{18}}{3} = 2\sqrt{15}$

5.  $\sqrt{500} - \sqrt{180} + \sqrt{80} = 10\sqrt{5} - 6\sqrt{5} + 4\sqrt{5} = 8\sqrt{5}$

6. The perimeter of a rectangle is  $20 + 4\sqrt{3}$  cm. If the length of the rectangle is  $2 + \sqrt{3}$  cm, what is the width? **Width =  $(8 + \sqrt{3})$  cm**

#### #7 - 9 Simplifying Linear Expressions using the Distributive Property

7.  $5(13x - 15) = 65x - 75$

8.  $\frac{5}{6}(7 + 3x) = \frac{35}{6} + \frac{5}{2}x$

9.  $9(2x - 11) - (5x - 11) = 18x - 99 - 5x + 11 = 13x - 88$

#### #10 - 16 Adding, Subtracting, & Multiplying Polynomials



## Honors Geometry Summer Support Packet

10.  $(5x^2 + 2x - 1) + (3x^2 - 8x - 9) = 8x^2 - 6x - 10$

11.  $(2x^2 - 7x - 5) - (3x^2 + 11x - 4) = -1x^2 - 18x - 1$

12.  $\frac{3}{4}(5x - 1) - 7(x - 4) = 3x - \frac{3}{4} - 7x + 28 = -4x + 27\frac{3}{4}$

13.  $(3x - 1)(5x + 7) = 15x^2 + 16x - 7$

14.  $(2x - 5)^2 = 4x^2 - 20x + 25$

15.  $(2x - 5)(2x + 5) = 4x^2 - 25$

16.  $(7x - 2)(x^2 + 3x - 5) = 7x^3 + 19x^2 - 41x + 10$

### #17 - 20 Factoring Quadratic Expressions Completely

17.  $m^2 - 7m - 30 = (m - 10)(m + 3)$

18.  $4p^2 - 6p - 4 = 2(2p^2 - 3p - 2) = 2(2p + 1)(p - 2)$

19.  $10y^2 + 19y + 6 = (5y + 2)(2y + 3)$

20.  $20k^2 - 125 = 5(4k^2 - 25) = 5(2k - 5)(2k + 5)$

### #21- 34 Solving Linear and Quadratic Equations

21.  $3x - 7 = 0 \quad x = 7/3$

22.  $17 - 4x = 27 \quad x = -5/2$

23.  $3(5x - 1) = 12 \quad x = 1$

24.  $\frac{1}{2}x^2 = 18 \quad x = +6, -6$

25.  $3x^2 - 48 = 0 \quad x = +4, -4$

26.  $(x - 5)^2 = 4x^2 \quad x = 5/3; -5$

27.  $2x(x - 4) = 2(x^2 - 6x - 8) \quad x = 4$





## Honors Geometry Summer Support Packet

28.  $-10 + 2x + 3(5 - x) = \frac{1}{2}(4x - 8)$   $x = 3$

29.  $\frac{3}{4}(24 - 8b) = 2(5b + 1)$   $b = 1$

30.  $4.21x + 5.39 = 12.07(2.01 - 4.72x)$   $x = .30844$

31.  $(y + 6)(4y - 5) = 0$   $y = -6; 5/4$

32.  $n^2 - 11n + 18 = 0$   $n = 9; 2$

33.  $7x^2 + 5x + 8 = 10$   $x = 2/7; -1$

34. The area of a rectangle is given by  $12x^2 + 5x - 2$ . One side has a length of  $4x - 1$ . Find the width of the rectangle. **Width =  $(3x + 2)$**

### #35 - 36 Solving for k

35.  $x^2 - 4x + k = (x - 2)^2$   $k = 4$

36.  $x^2 + 6x + k = (x + 3)^2$   $k = 9$

### #37-38 Writing Equations to Represent 2-D and 3-D figures

37. The length of a rectangle is 2 feet more than twice the width. The perimeter is 34 feet. Write an equation and solve for the dimensions of the rectangle.  **$2w + 2(2 + 2w) = 34$  length = 12 ft; Width = 5 ft**

38. If the dimensions (length, width, and height) of a rectangular prism are  $(x + 2)$ ,  $(x + 1)$ , and  $(2x - 1)$ , then how would you represent the volume of the prism in terms of  $x$ ?  **$V(x) = (x+2)(x+1)(2x-1)$  or  $V(x) = 2x^3 + 5x^2 + x - 2$**

### #39 - 46 Writing Linear Equations

39. Determine the slope of the line passing through  $(5, -6)$  and  $(3, -6)$   **$m = 0$**

40. Find the value of  $y$  so that the line passing through  $(2, 6)$  and  $(1, y)$  has a slope of 5.  **$y = 1$**

41. What is the slope of the line whose equation is  $4x + 3y = 15$   **$m = -4/3$**

42. Write the slope-intercept form of the equation of the line that passes through the points  $(4, 8)$  and  $(2, -10)$ .  **$y = 9x - 28$**

43. Write the slope-intercept form of the equation of the line that has the slope  $4/3$  and passes through the point  $(0, 6)$   **$y = 4/3x + 6$**



### Honors Geometry Summer Support Packet

44. Write the standard form of the equation of the line that has the slope  $-3/2$  and passes through the point  $(2, 4)$   $3x + 2y = 14$

45. Write the equation of a vertical line that passes through the point  $(4, 9)$   $x = 4$

46. Write the equation of a horizontal line that passes through the point  $(-3, 7)$ .  $y = 7$

#### #47 - 50 Solving Literal Equations

47. If the formula for the perimeter of a rectangle is  $P = 2l + 2w$ , then solve for  $w$  in terms of  $P$  and  $l$ .

$$w = \frac{P-2l}{2}$$

48. The equation for the volume of a cylinder is  $V = \pi r^2 h$ . Solve for the positive value of  $r$ , in terms of  $h$

and  $V$ .  $r = \sqrt{\frac{V}{\pi h}}$

49. The equation for the volume of a cone is  $V = \frac{1}{3}\pi r^2 h$ . Solve for the positive value of  $r$ , in terms of  $h$  and

$V$ .  $r = \sqrt{\frac{3V}{\pi h}}$

50. The formula for the volume of a pyramid is  $V = \frac{1}{3}Bh$ . What is  $h$  expressed in terms of  $B$  and  $V$ ?

$$h = \frac{3V}{B}$$