Honors Geometry Summer Packet #1 2026 **Name:___________________________**

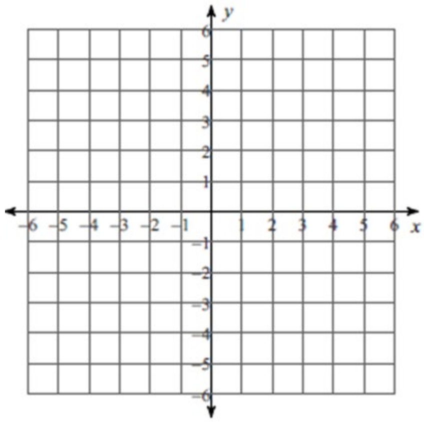
This packet is to help you review topics that are considered to be prerequisite knowledge upon entering Honors Geometry. In order to ensure that the good skills you developed this year in your Algebra 1 course do not disappear this summer, working on this packet is a requirement to be completed over the summer. It is **NOT** recommended to complete immediately following school dismissal in June or the night before the packet is due. Student learning is most effective if the packet is completed over the months of July and August. Honors Geometry students will be tested on the materials covered in this packet within the first few weeks of school once the teacher has discussed the packet in the classroom.

I. Linear Equations: Solve the following equations for unknown variable. Be sure to show all your work.

A) $2(x+5)=3(x-2)$	B) $180-x=3(90-x)$
C) $-\frac{2}{5}x+3=11$	D) $3x(x-1)=(3x+2)(x-1)$
E) $-6(n-6)-3(n-4)=21$	F) $3-3p=-7p+7$
G) $38+8r=-8(6-6r)+3r$	H) $\frac{1}{3}x+\frac{1}{5}=\frac{1}{5}x-1$

II. Graphing Linear Functions:

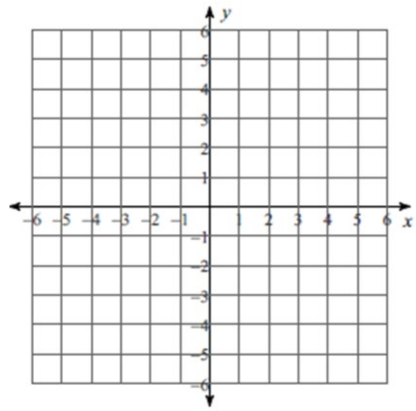
A) Sketch the graph of $y = \frac{1}{3}x - 4$



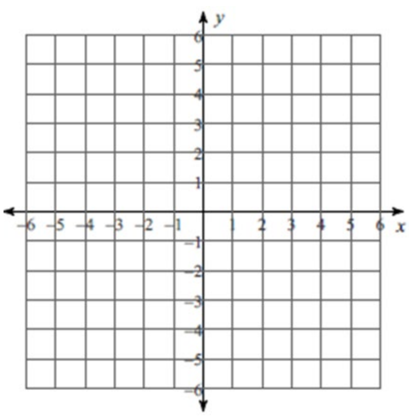
B) Using Slope Intercept Form sketch the graph of $3x - y = 5$

m = ________

b = ________



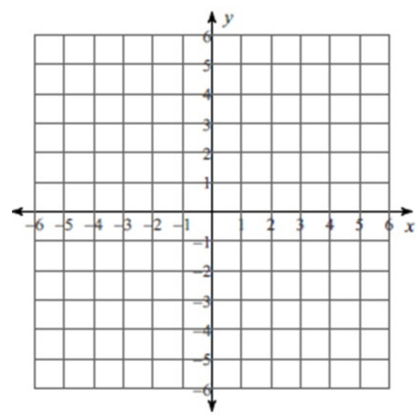
C) Using Slope Intercept Form sketch the graph of $6x + 5y = 5$



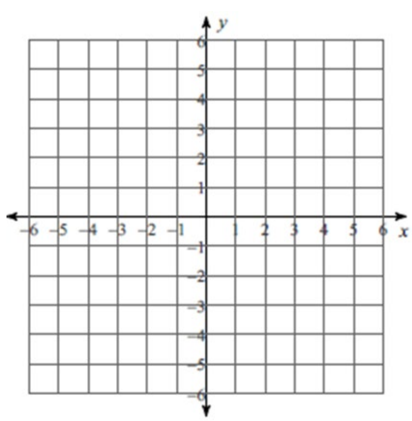
m = ________

b = ________

D) Sketch the graph of the line $x = 2$ and describe its slope.



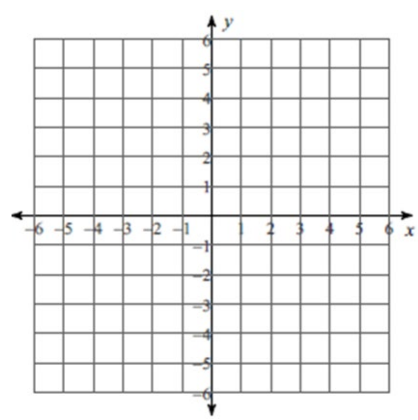
E) Sketch the graph of the line $y = -3$ and describe its slope.



F) Using Slope Intercept Form sketch the graph of both lines and describe their relationship.

$y = \frac{-1}{2}x$

$-2y = x + 10$



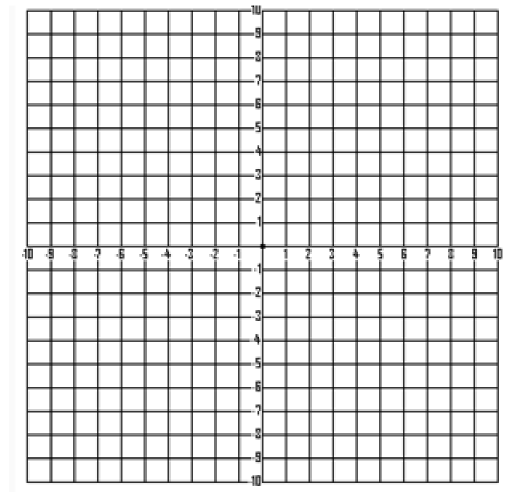
III. Writing Linear Equations: Write the equation of the line in the form stated using the following description. Be sure to graph the line as well.

State the 3 forms of a Line:

1. Slope Intercept:________________ 2. Standard Form: _________________ 3. Point Slope: __________________

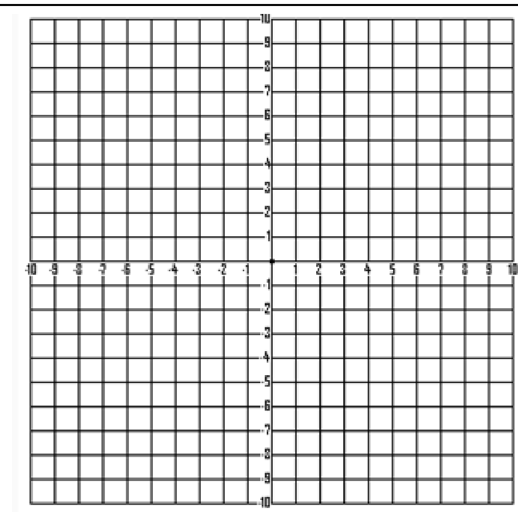
A) A line with a slope of 3 and contains the point $(2, -1)$

Standard Form:___________________________



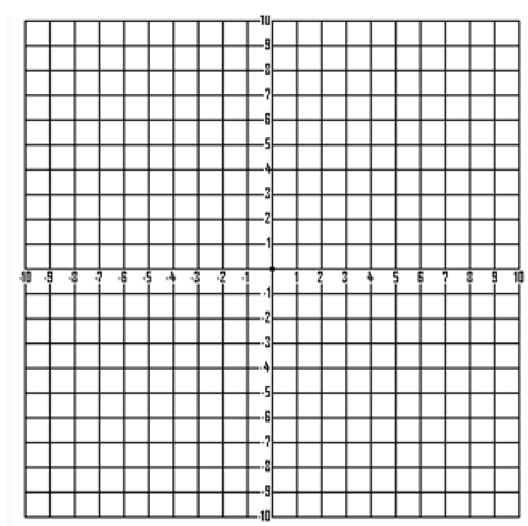
B) The line contains the points $(4, 2)$ *and* $(-6, 12)$

Slope Intercept Form:_________________________



C) The line perpendicular to $y = \frac{-1}{2}x - 7$ *and contains* $(1, 4)$

Point Slope Form:________________________________



IV. Proportions: Solve the following proportions. Show all your work.

A) $\frac{5}{3x} = \frac{1}{15}$	B) $\frac{x-2}{4} = \frac{x+10}{10}$
C) $\frac{2}{x-3} = \frac{6}{x-2}$	D) $\frac{10}{6x+7} = \frac{6}{2x+9}$

V. Exponent Properties: Simplify each expression using properties of exponents. **NO NEGATIVES in FINAL ANSWERS!!**

A) $4x^4y^5 \cdot -5x^2y$	B) $3x^7y^2 \cdot 9x^{12}y^4$
C) $(-6x^3y^2)^2$	D) $\frac{12p^7q^6}{18p^4q^{12}}$
E) $x^3x^5x^{-11}$	F) $(2u^{-2})^3$
G) $\frac{5p^{10}q^2}{15p^4q^8}$	H) $(-5x^{-5}w^7)^3$

VI. Factor Completely:

A) $x^2 + 8x + 15$	B) $x^2 - 13x + 36$
C) $10r^2 - 35r$ Hint: Think GCF	D) $x^2 + 4x - 32$
E) $3y^2 + 2y - 4$	F) $5x^2 - 19x - 4$
G) $p^2 - 64$	H) $100x^2 - 49$

VII. Solve by Factoring: Solve for x by factoring.

A) $x^2 - 13x - 30 = 0$	B) $2x^2 + 5x = 3$
C) $x^2 + 14x + 49 = 0$	D) $6x^2 = 24$

VIII. Solve the System of Equations:

A) Solve by **ELIMINATION METHOD:**	B) Solve by **ELIMINATION METHOD:**
$-3x + y = 5$ $5x - y = -11$	$x - 2y = -18$ $3x + 5y = 1$
C) Solve by **SUBSTITUTION METHOD:** $y = -4x - 11$ $3x + 7y = -2$	D) Solve by **SUBSTITUTION METHOD:** $-2x - 5y = -5$ $x - 5y = -20$

IX. Solve Using System of Equations:

A. Define the variables and write the system of equations. Then, solve using ANY METHOD.

Abby filled her goodie bags with 4 cookies and 3 candy bars and spent a total of \$10.25 per bag. Marissa filled her goodie bags with 2 cookies and 7 candy bars and spent a total of \$14.75 per bag. Each cookie costs the same amount. Each candy bar costs the same amount. Write a system of linear equations that can be used to find the cost of one cookie (x) and one candy bar (y). What was the cost, in dollars, of each candy bar?

B. Define the variables and write the system of equations. Then, solve using ANY METHOD.

The sum of two numbers is 172. The first is eight less than five times the second. Find the numbers.

X. Solutions or Not? Show work to justify your answers.

A. Determine if the ordered pair $(-5, -1)$ is a solution of $2x - y = -11$.

B. Determine if the ordered pair $(3, -2)$ is a solution of $4x - 3y = 18$.

C. Determine if the ordered pair is a solution to the system. $(-2, 1)$

$$6x + 5y = -7$$
$$x - 2y = 0$$

D. Determine if the ordered pair is a solution to the system. $(5, 2)$

$$2x - 3y = 4$$
$$2x + 8y = 11$$

XI. Solve by Taking Square Roots.

A. $x^2 + 7 = 32$

B. $x^2 - 8 = 41$

C. $16x^2 - 49 = 0$

D. $2x^2 - 64 = 0$

XII. Key Features of a Parabola

Vertex: (,)

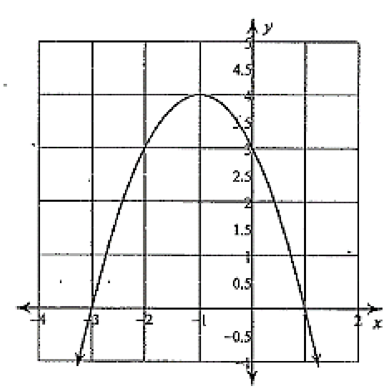
Maximum or minimum (circle one)

y-intercept: ________________

Axis of symmetry: ____________

Zeros (roots or x-intercepts): _______________

Concave up or Concave down (circle one)



Honors Geometry Summer Packet #2 2026 **Name:______________________**

Please follow the guided notes with examples provided and complete any "Practice" problems on your own. The packet will be due on the first day of class. We will review this the first few days of class and an assessment will be given.

Introduction to Square Roots

Taking the square root of a number is the opposite of squaring the number. Even your calculator knows this because $\boldsymbol{x^2}$ *has* $\sqrt{\ }$ *above it.*

Recall: $\sqrt{25}$ **= 5** **because** 5^2 **= 25**

Let's practice – These are the ones we should know! But of course, there are more than just these ones!

Perfect Squares:	**Perfect Square Roots:**
$1^2 = 1$	$\sqrt{1} = 1$
$2^2 = 4$	$\sqrt{4} = 2$
$3^2 = 9$	$\sqrt{9} = 3$
$4^2 = 16$	$\sqrt{16} = 4$
$5^2 = 25$	$\sqrt{25} = 5$
$6^2 = 36$	$\sqrt{36} = 6$
$7^2 = 49$	$\sqrt{49} = 7$
$8^2 = 64$	$\sqrt{64} = 8$
$9^2 = 81$	$\sqrt{81} = 9$
$10^2 = 100$	$\sqrt{100} = 10$
$11^2 = 121$	$\sqrt{121} = 11$
$12^2 = 144$	$\sqrt{144} = 12$

Now that we have these perfect squares, we can combine them and do some operations

Example 1: $\sqrt{18-2}$

$= \sqrt{\mathbf{16}} \quad = \quad \mathbf{4}$

Example 2: $\sqrt{3(4)+13}$

$= \sqrt{\mathbf{12+13}} \quad = \quad \sqrt{\mathbf{25}} \quad = \quad \mathbf{5}$

Example 3: $\sqrt{49}+\sqrt{100}$

$= \mathbf{7} \quad + \quad \mathbf{10} \quad = \quad \mathbf{17}$

Example 4: $\dfrac{\sqrt{144}}{\sqrt{9}}$

$= \dfrac{\mathbf{12}}{\mathbf{3}} \quad = \quad \mathbf{4}$

Example 5: $2\sqrt{16}+5$

$= \mathbf{2 \cdot 4 + 5} \quad = \quad \mathbf{8 + 5 = 13}$

Example 6: $-\sqrt{81}-10$

$\mathbf{-9 - 10} \quad = \quad \mathbf{-19}$

<u>Practice:</u> Complete the following. Be sure to show your work.

1. $\sqrt{36}+\sqrt{121}$

2. $3\sqrt{4}+2\sqrt{64}$

3. $\dfrac{\sqrt{100}}{\sqrt{25}}$

4. $\sqrt{21-5}-7\sqrt{5(5)}$

5. $\sqrt{\mathbf{81}} - \mathbf{2}\sqrt{\mathbf{144}}$

6. $-\sqrt{\mathbf{121}} + \sqrt{\mathbf{16}}$

Simplifying Non Perfect Square Roots

Key Concepts:

- $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ for $a \geq 0$ and $b \geq 0$.
- An entire radical can be simplified to a mixed radical in simplest form by removing the largest perfect square from under the radical to form a mixed radical.

  For example, $\sqrt{50} = \sqrt{25 \times 2}$
  $= 5\sqrt{2}$

Examples: Simplify

a) $\sqrt{50} = \sqrt{25 \times 2}$ — Choose 25×2, not 5×10, as 25 is a perfect square factor.

$= (\sqrt{25})(\sqrt{2})$ — Use $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$.

$= 5\sqrt{2}$

b) $\sqrt{27} = \sqrt{9 \times 3}$

$= (\sqrt{9})(\sqrt{3})$ — Use $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$.

$= 3\sqrt{3}$

c) $\sqrt{180} = \sqrt{36 \times 5}$

$= (\sqrt{36})(\sqrt{5})$

$= 6\sqrt{5}$

Practice: Simplify each non perfect square root.

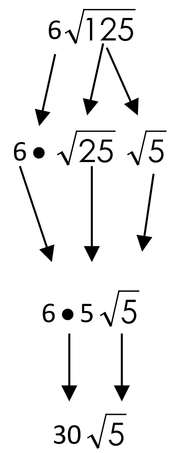
1) $\sqrt{28}$ **2)** $\sqrt{27}$ **3)** $\sqrt{48}$

4) $\sqrt{90}$ **5)** $\sqrt{98}$ **6)** $\sqrt{63}$

7) $\sqrt{75}$ **8)** $\sqrt{45}$ **9)** $\sqrt{32}$

More Simplifying Radicals:

When we put a coefficient in front of the radical, we are *multiplying* it by our answer <u>after</u> we simplify.
It looks like this



We keep bringing down each piece and multiply at the end.

Practice: Simplify each of the following:

1. $2\sqrt{18}$
2. $4\sqrt{12}$
3. $6\sqrt{72}$
4. $\frac{1}{2}\sqrt{20}$
5. $10\sqrt{32}$
6. $-2\sqrt{44}$

Multiplying with square roots:

We can multiply square roots by combining them under one radical!

Example 1: $\sqrt{3} \cdot \sqrt{27} = \sqrt{81} = 9$

Example 2: $\sqrt{18} \cdot \sqrt{8} = \sqrt{144} = 12$

Example 3: $4\sqrt{2} \cdot 3\sqrt{8} = 4 \cdot 3 \cdot \sqrt{2 \cdot 8} = 12 \cdot \sqrt{16} = 12 \cdot 4 = 48$

Example 4:

$$-5\sqrt{10} \cdot 4\sqrt{30} = -5 \cdot 4 \cdot \sqrt{10 \cdot 30} = -20 \cdot \sqrt{300} = -20 \cdot \sqrt{100} \cdot \sqrt{3} = -20 \cdot 10 \cdot \sqrt{3} = -200\sqrt{3}$$

Practice: Simplify by multiplying each expression. Be sure to simplify your product.

1) $\sqrt{6} \bullet \sqrt{2}$

2) $\sqrt{12} \bullet \sqrt{6}$

3) $2\sqrt{5} \cdot 4\sqrt{10}$

4) $3\sqrt{2} \cdot 8\sqrt{50}$

5) $5\sqrt{6} \bullet 4\sqrt{8}$

6) $-4\sqrt{3} \bullet 7\sqrt{15}$

Dividing Radicals

*When dividing radicals, we follow the same procedure as multiplying radicals. Now we divide the coefficients (outsides) and divide the radicals (insides).

*Sometimes when dividing radicals you get a whole number, which makes simplifying easy!

Example 1:

$$\frac{\sqrt{72}}{\sqrt{8}} = \sqrt{9} = 3$$

Here, we can just DIVIDE 72 by 8 and make a new radical with that answer. Then, simplify the radical if possible.

Example 2:

$$\frac{\sqrt{50}}{\sqrt{2}} = \sqrt{\frac{50}{2}} = \sqrt{25} = 5$$

Example 3:

$$\frac{\sqrt{3}}{\sqrt{3}} = 1$$

Remember that anything divided by itself is 1 (they cancel each other out).

Example 4:

$$\frac{\sqrt{48}}{\sqrt{2}} = \sqrt{\frac{48}{2}} = \sqrt{24} = \sqrt{4} \cdot \sqrt{6} = 2\sqrt{6}$$

Example 5:

$$\frac{\sqrt{96}}{\sqrt{3}} = \sqrt{\frac{96}{3}} = \sqrt{32} = \sqrt{16} \cdot \sqrt{2} = 4\sqrt{2}$$

*When there are numbers in front of the radicals **(coefficients)** you must divide those too! Be sure to leave coefficients in fraction form.

Example 6:

$$\frac{6\sqrt{10}}{3\sqrt{2}} = 2\sqrt{\frac{10}{2}} = 2\sqrt{5}$$

Example 7:

$$\frac{3\sqrt{54}}{6\sqrt{3}} = \frac{1}{2}\sqrt{\frac{54}{3}} = \frac{1}{2}\sqrt{18} = \frac{1}{2}\cdot\sqrt{9}\cdot\sqrt{2} = \frac{1}{2}\cdot 3\cdot\sqrt{2} = \frac{3}{2}\sqrt{2}$$

*What if we take the radical of a fraction?

First, take the square root of the numerator; then, take the square root of the denominator, **SEPARATELY**!!!

Example 1:

$$\sqrt{\frac{4}{9}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$$

Example 2:

$$\sqrt{\frac{16}{25}} = \frac{\sqrt{16}}{\sqrt{25}} = \frac{4}{5}$$

Practice: Divide; then simplify the quotient.

1) $\frac{9\sqrt{6}}{3\sqrt{6}}$

2) $\frac{\sqrt{20}}{\sqrt{5}}$

3) $\frac{\sqrt{40}}{\sqrt{5}}$

4) $\frac{25\sqrt{24}}{5\sqrt{2}}$

5) $\frac{12\sqrt{60}}{6\sqrt{5}}$

6) $\frac{3\sqrt{120}}{9\sqrt{5}}$

7) $\frac{\sqrt{300}}{\sqrt{5}}$

8) $\frac{2\sqrt{33}}{\sqrt{11}}$

9) $\frac{8\sqrt{48}}{2\sqrt{3}}$

10) $\frac{\sqrt{25}}{\sqrt{36}}$

11) $\frac{35\sqrt{108}}{7\sqrt{4}}$

12) $\sqrt{\frac{9}{64}}$

Adding/Subtracting Like Square Roots:

Example 1: $\sqrt{2} + \sqrt{2}$

$1\sqrt{2} + 1\sqrt{2}$

$= 2\sqrt{2}$

Recall: x + x

1x + 1x

= 2x

NOTE:

-These numbers can be "added" because the radicands are the same.

-However, only the numbers in front, which are 1's, are added. Nothing happens to the $\sqrt{2}$. It is almost like an x.

Example 2: $2\sqrt{3} + 4\sqrt{3}$

$= 6\sqrt{3}$

Example 3: $6\sqrt{5} - 4\sqrt{5}$

$= 2\sqrt{5}$

Practice: Add/Subtract

1) $7\sqrt{6} + 2\sqrt{6}$

2) $\sqrt{13} + 5\sqrt{13}$

3) $4\sqrt{11} - \sqrt{11}$

4) $2\sqrt{3} - 6\sqrt{3}$

5) $-10\sqrt{2} + 3\sqrt{2}$

6) $-8\sqrt{15} - 9\sqrt{15}$

7) $\sqrt{3} + 8\sqrt{3}$

8) $3\sqrt{5} - 7\sqrt{5}$

9) $5\sqrt{3} + 2\sqrt{3} - 6\sqrt{3}$