

NAME: _____

HONORS GEOMETRY SUMMER PACKET NHHS and VHS

Read the directions below carefully:

Completion of this summer packet is required for all students enrolled in Honors Geometry for the upcoming school year. Honors Geometry requires a good foundation in algebra 1 and middle school geometry skills to be successful. This packet should be completed without a calculator. Either circle your final answers or write the final answer on the blank if one is provided. Follow the directions in the packet and complete all the exercises neatly showing all work *in the packet*. Check the answers provided on the last pages. Rework any incorrect problems until you are able to reach the correct answer. If you have forgotten how to do any of the problems in the packet use the internet, Khan Academy or “google” to review the skills. Since the answers are provided to you, no credit will be given if work is not shown for each problem.

The entire packet will be due on the first day of the school year. A test on the material in this packet will occur during the first full week of school. This test will be entirely non-calculator. **The score on the test is a strong indicator of success in this class.** Content in the packet will not be reviewed during class time. It is an expectation that students are to have mastered the content in this packet before the start of the school year.

The decision to take an Honors class is a serious one. The work in this class will require the following:

- Exemplary work habits.
- Exemplary time management skills.
- A genuine desire to learn.
- Personal responsibility for attendance and work requirements.
- Independent review and study habits.
- Self-discipline and determination to succeed.

For the upcoming school year we highly recommend that you purchase a TI83+ or TI-84+ calculator prior to the start of the school year. They are required for the NJSLA exam and for future high school math classes.

1. Find the slope of a line through the points (3, 1) and (-5, 7) _____

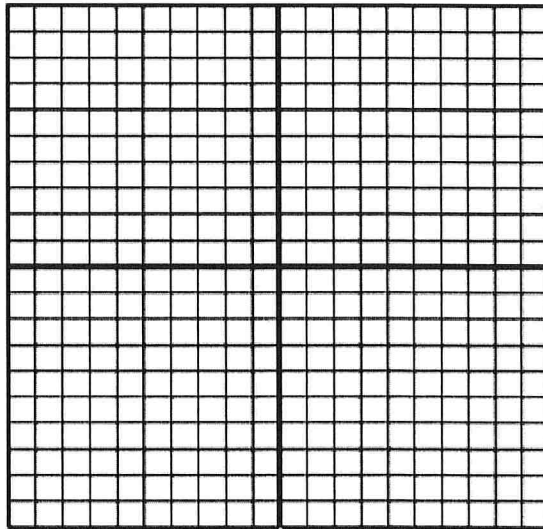
2. Find the slope of the line with an x-intercept of 4 which goes through the point (7, 5) _____

3. Graph each line and label it as a, b, and c.

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

b. $x - 2y = 6$

c. $y - 2 = -2(x + 3)$



4. A line has y-intercept 6 and passes through the point (3, 4)

a. Write the equation of the line in slope-intercept form.

a. _____

b. Write the equation of the line in standard form.

b. _____

c. Write the equation of the line in point-slope form

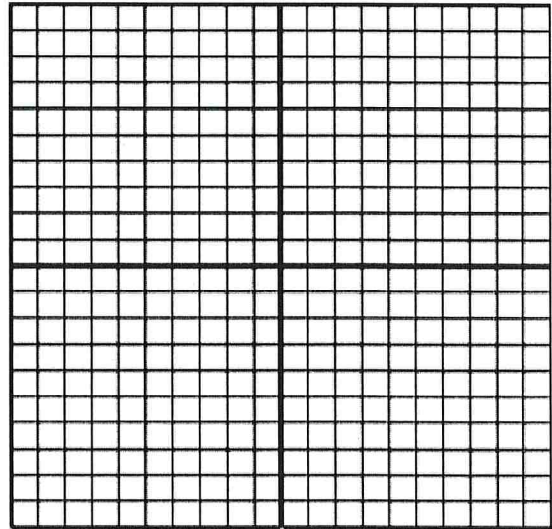
c. _____

5. Graph each line and label it as a, b, and c.

a. $x = 8$

b. $y = -3$

c. $y = -x$



Solve for the variable. Be sure to show all work and give the EXACT answer (do not write any answers as decimals).

6. $-\frac{2}{3}x + 1 = \frac{1}{2}x + 4$

7. $2(x - 8) + 7 = 5(x + 2) - 3x - 19$

$$8. \frac{x}{3} + \frac{3}{4} = \frac{5x}{6} - 1$$

$$9. -3x + 5(6 - x) = 4(1 - 2x)$$

$$10. x^2 - 18 = 0$$

$$11. x^2 + 16 = 0$$

Solve the equations below by factoring.

$$12. x^2 + 5x = 0$$

$$13. x^3 = 8x$$

$$14. x^2 + 7x = -10$$

$$15. x^2 + 3x - 40 = 0$$

Factor completely

16. $5x^2 - 7x - 12$

17. $2x^2 + 11x + 15$

18. $4x^3 + 9x^2 - 36x - 81$

19. $x^4 - 256$

20. $12x^3 - 22x^2 - 70x$

21. $1 - 100x^2$

Solve each equation by using the quadratic formula. Leave answers as simplified radicals when applicable.

22. $x^2 + 4x + 21 = 22$

23. $4x^2 + 6x = 12$

Simplify the following radicals:

24. $\sqrt{52}$

25. $\sqrt{245}$

26. $4\sqrt{2} \cdot 5\sqrt{8}$

27. $\sqrt{27} + 2\sqrt{3} - \sqrt{12}$

28. $\sqrt{3}(\sqrt{7} + 3\sqrt{2})$

Solve the following systems of equations algebraically (by substitution or elimination method)

You must be able to use both methods

29.
$$\begin{cases} 5x + 2y = 11 \\ x + 6y = 19 \end{cases}$$

30.

$$\begin{aligned} y &= -2 \\ 4x - 3y &= 18 \end{aligned}$$

31.

$$\begin{cases} 6x + 3y = -12 \\ 2x + y = -4 \end{cases}$$

32.

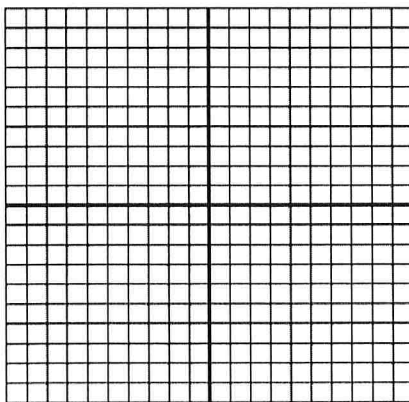
$$\begin{cases} y = 5x - 7 \\ 20x - 4y = 9 \end{cases}$$

33.

$$\begin{cases} -2x + 6y = 6 \\ -7x + 8y = -5 \end{cases}$$

34.

Solve the system of equations by graphing **accurately**. State the final answer. $\begin{cases} y = 3x - 5 \\ y = 5 - 2x \end{cases}$



Solve the equations below.

35. $|-2x + 6| = 6$

36. $4 - 3|x| = 10$

Solve each equation for the variable indicated.

37. $q = p(r + s)$, for p

38. $10c - f = -13 + cd$, for c

39. $\frac{(df + 10)}{6} = g$, for f

40. $x = b - cd$, for c

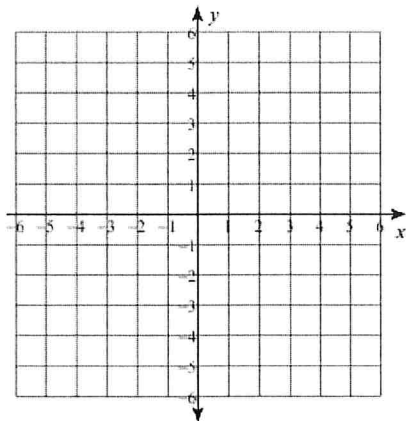
Solve the inequalities below and graph the solutions on a number line

41. $-2 \leq x + \frac{1}{2} < 4 \frac{1}{2}$

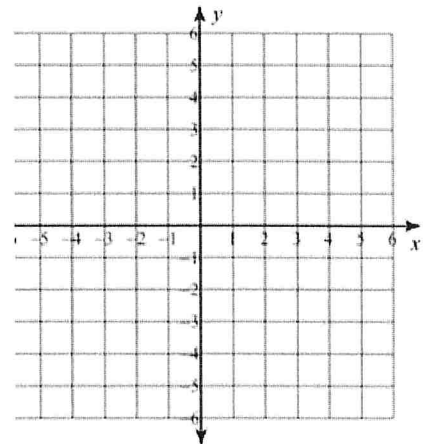
42. $4 + 3x \geq 1$ or $-5x > 25$

Graph the linear inequalities below

43. $y \leq \frac{4}{3}x - 4$



44. $5x - 3y \leq -15$



45. A line contains (2, 3) and is perpendicular to the line $y = -\frac{1}{2}x + 4$. Write the equation of this line in slope-intercept form.

46. A line contains (0, -2) and is parallel to the line $x + 2y = 6$. Write the equation of this line in slope-intercept form.

Determine the x and y-intercepts of the lines below:

47. $2x - y = 12$

48. $4x + 9y = 6$

Simplify using only positive exponents:

49. $(-4m^2n^3)(2mn)$

50. $\left(\frac{r^{-1}s^2t^{-3}}{r^{-2}s^0t}\right)^{-1}$

51. $\left(\frac{(3r^{-2}s^3t^0)^{-3}}{3rs}\right)$

Geometry Review

Symbol	Meaning
\angle	Angle
\widehat{AB}	Arc AB
$m\widehat{AB}$	Measure of arc AB
\overleftrightarrow{AB}	Line AB
\overrightarrow{AB}	Ray AB
\overline{AB}	Line segment AB
AB	Length of line segment AB
\equiv	Congruent
$^\circ$	Degree
\parallel	Parallel
\perp	Perpendicular
\sim	Similar
\triangle	Triangle

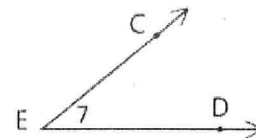
52.

What are three possible names for the line shown?



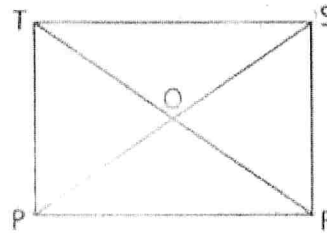
53.

What are four possible names for the angle shown?



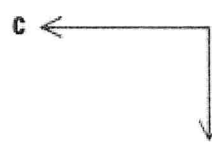
54.

- Name $\angle OPR$ in all other possible ways.
- What is the vertex of $\angle TOS$?
- How many angles have vertex R ?
- Name $\angle TSP$ in all other possible ways.
- How many triangles are there in the figure?

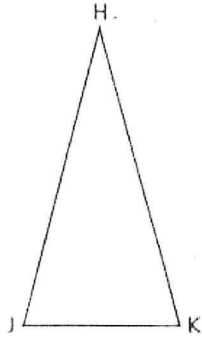


55.

Classify each of the angles below as acute, right, or obtuse. Then estimate the number of degrees in the angle.



56.



- a** In $\triangle HJK$, \overline{HJ} is twice as long as \overline{JK} and exactly as long as \overline{HK} . If the length of \overline{HJ} is 15, find the perimeter of (the distance around) $\triangle HJK$.
- b** If the length of \overline{HJ} were $4x$, the length of \overline{HK} were $3x$, the length of \overline{JK} were $2x$, and the perimeter of $\triangle HJK$ were 63, what would the length of \overline{HJ} be?

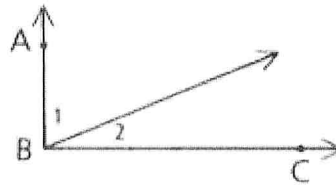
57.

Given: $\angle ABC$ is a right angle.

$$\angle 1 = (3x + 4)^\circ,$$

$$\angle 2 = (x + 6)^\circ$$

Find: $m\angle 1$ (the measure of $\angle 1$)

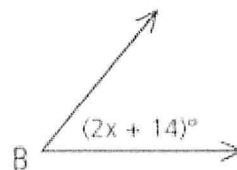


58. (Give your answers as compound inequalities)

$\angle B$ is acute.

a What are the restrictions on $m\angle B$?

b What are the restrictions on x ?

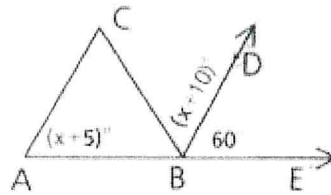


Definition *Congruent* (\cong) *angles* are angles that have the same measure.

Definition *Congruent* (\cong) *segments* are segments that have the same length.

59.

If $\angle CBD \cong \angle DBE$, find $m\angle A$.



60.

Given: $\overline{XS} \cong \overline{YT}$, $\overline{YS} \cong \overline{XT}$,

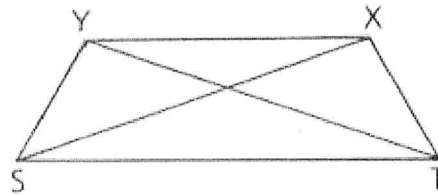
$$XT = 2r + 5,$$

$$XS = 3m + 7,$$

$$YS = 3\frac{1}{2}r + 2,$$

$$YT = 4.2m + 5$$

Solve for r and m .



61.

Given: $\angle 1 \cong \angle 2$,

$$m\angle 1 = x + 14,$$

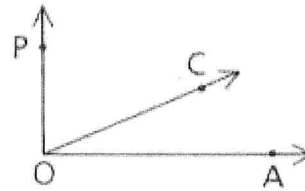
$$m\angle 2 = y - 3$$

Solve for y in terms of x .



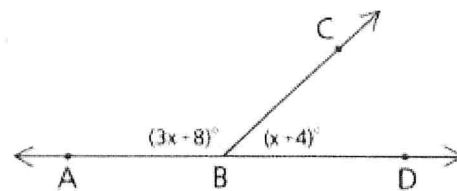
62.

If $\angle POA$ is a right angle and if $\angle POC$ is three times as large as $\angle COA$, find $m\angle POC$.



63.

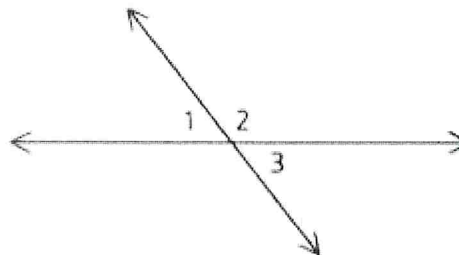
Find $m\angle ABC$ (the measure of $\angle ABC$).



64.

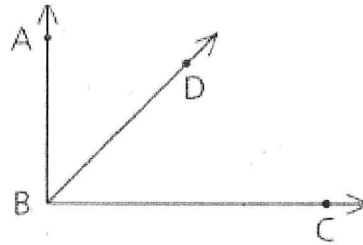
Given: $m\angle 1 = 2x + 40$,
 $m\angle 2 = 2y + 40$,
 $m\angle 3 = x + 2y$

Find: $m\angle 1$, $m\angle 2$, and $m\angle 3$



65.

$\angle ABC$ is a right angle. The ratio of the measures of $\angle ABD$ and $\angle DBC$ is 3 to 2. Find $m\angle ABD$. (Hint: Let $m\angle ABD = 3x$ and $m\angle DBC = 2x$.)



Answers

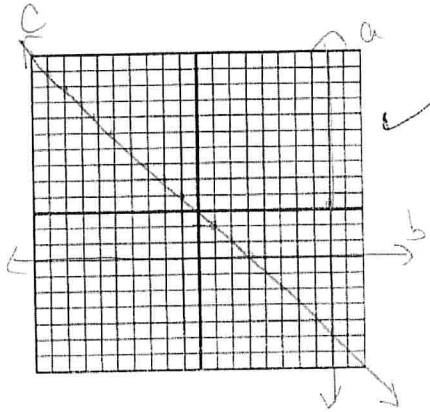
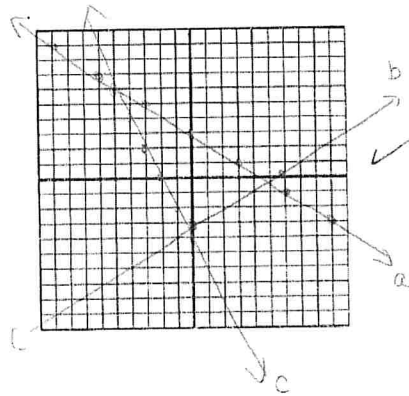
1. $-\frac{3}{4}$ 2. $\frac{5}{3}$ 3.

4a. $Y = -\frac{2}{3}x + 6$

4b. $2x + 3y = 18$

4c. $Y - 4 = -\frac{2}{3}(x - 3)$ or $y - 6 = -\frac{2}{3}(x - 0)$

5



6. $X = -18/7$ 7. $X = -9$ 8. $X = 7/2$ 9. No solution

10. $X = \pm 3\sqrt{2}$ 11. No solution 12. Factor: $x(x+5)$ Ans: $x = 0, x = -5$

13. Factor: $x(x^2 - 8)$ Ans: $x = 0, x = \pm 2\sqrt{2}$ 14: Factor: $(x+5)(x+2)$ Ans: $x = -5, x = -2$

15. Factor: $(x + 8)(x - 5)$ Ans: $x = -8, x = 5$ 16. $(5x - 12)(x + 1)$

17. $(2x + 5)(x + 3)$ 18. $(x + 3)(x - 3)(4x + 9)$ 19. $(x + 4)(x - 4)(x^2 + 16)$

20. $2x(3x + 5)(2x - 7)$ 21. $(1 + 10x)(1 - 10x)$

22. Complete the square: $(x + 2)^2 = 5$ Ans: $x = 2 \pm \sqrt{5}$

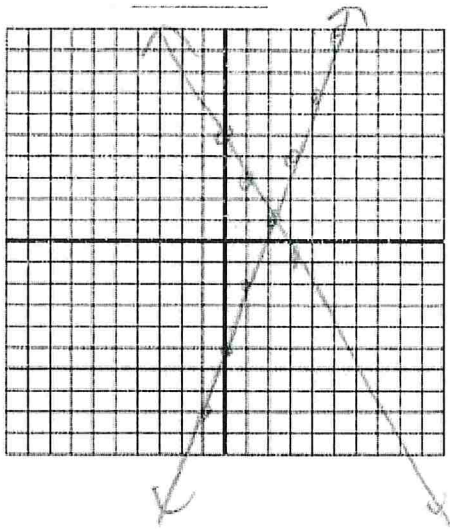
23. Complete the square: $(x + \frac{3}{4})^2 = \frac{57}{16}$ Ans: $x = -\frac{3}{4} \pm \sqrt{57}/4$

24. $2\sqrt{13}$ 25. $7\sqrt{5}$ 26. 80 27. $3\sqrt{3}$ 28. $\sqrt{21} + 3\sqrt{6}$

29. (1, 3) 30. (3, -2) 31. All real numbers/ininitely many solutions

32. No solution 33. (3, 2)

34.



Ans: (3, 2)

35. $X = 0, 6$

36. $X = 2, -2$

37. $p = \frac{q}{r + s}$

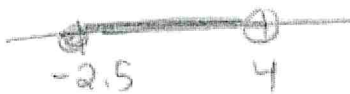
38. $c = \frac{-13 + f}{10 - d}$

39. $f = \frac{(6g - 10)}{d}$

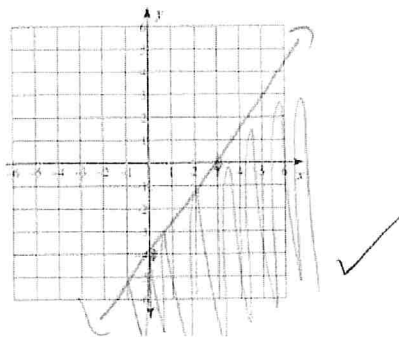
40. $c = \frac{x - b}{-d}$ or $c = \frac{-x + b}{d}$

41. $-5/2 \leq x < 4$

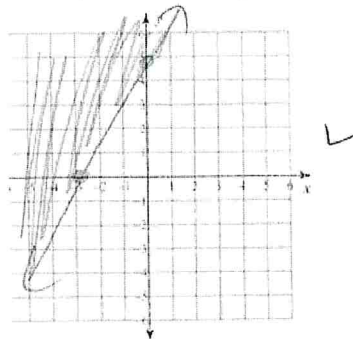
42. $X \geq -1$ or $x < -5$



43. $y \leq \frac{4}{3}x - 4$



44. $5x - 3y \leq -15$ $y \geq \frac{5}{3}x + 5$



45. $Y = 3x - 3$ 46. $Y = -\frac{1}{2}x - 2$ 47. X int : (6, 0) Y int (0, -12)

48. X int (3/2, 0) Y int (0, 2/3) 49. $-8m^3n^4$

50. $\frac{t^4}{rs^2}$ 51. $\frac{r^5}{81s^{10}}$ 52. $\overleftrightarrow{AB}, \overleftrightarrow{BA}, l$ 53. $\angle CED, \angle DEC, \angle 7, \angle E$

54. A. $\angle RPO, \angle SPR, \angle RPS$ b. O c. 3 d. $\angle PST, \angle TSO, \angle OST$ e. 8

55a. Acute, 45° (Answers will vary) b. Obtuse, 150° (answers will vary), c. right, 90°

56a. $37\frac{1}{2}$ b. 28 57. 64° 58. A. $0 < m < B < 90$ b. $-7 < x < 38$

59. 55° 60. $R = 2, m = 5/3$ 61. $Y = x + 17$ 62. $67\frac{1}{2}^\circ$

63. 134° 64. $m < 1 = 80^\circ, m < 2 = 100^\circ, m < 3 = 80^\circ$ 65. 54°