Algebra 2 Honors

Name:_____

Summer Homework Assignment

Directions: Show all work clearly and neatly organized on a separate sheet of paper.

Solve:

1. $3(4-5k)=2k-4$

2. $12x-24=-14x+28$

3. $18=-6(p+5)$

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

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

6. $4a+1=a-5-3a$

7. $|2y-3|+4=33$

8. $|5x-4|+10=4$

9. $-6|5-2y|-4=-13$

10. $|8+p|=2p-3$

11. $4|2y-7|+5=9$

12. $-2|7-3y|-6=-14$

13. $1+5(x-8)\le 2-(x+5)$

14. $23-4u<3$

15. $4n-5(n-3)>3(n+1)-20$

16. $1-8u\le 3u-10$

17. $-8\le 3y-20<52$

18. $3(5x-2)<24$ or $6x-4>9+5x$

19. $2x-3>15$ or $3-7x<17$

20. $35-5x\le 0$ and $5x+6\ge -14$

21. $-1\le 3z+2\le 8$

22. $2z-1\le 5$ or $3z-5>10$

23. $-9<2r-5<-1$

24. $2t+7\ge 13$ or $5t-4<6$

25. $2x+3>1$ and $5x-9\le 6$

26. $-3<2-\frac{d}{3}\le -1$

27. $3k+7<1$ or $2k-3>1$

28. $-6\le 2-3m\le 7$

29. $7q-1>q+11$ or $-11q>-33$

30. $5n-1>0$ or $4n+2<0$

Solve:

31. $|3-2t|<5$

32. $|2t-1|+3\geq 8$

33. $|2d-8|>12$

34. $|3d+18|\leq 6$

35. $3|y-8|+15<21$

36. $|7y+14|-5<30$

37. $|2u-1|+3\leq 6$

38. $4-|3k+1|<2$

39. $7-3|4d-7|\geq 4$

40. $6+5|2r-3|\geq 4$

Graph each of the following on GRAPH PAPER.

41. $y=-\frac{2}{3}x+5$

42. $y=4x-1$

43. $x-3y=9$

44. $2x+5y=-15$

45. $4x-6y=24$

46. $-3x+2y=-14$

47. $3x-y>-5$

48. $x-2y<8$

49. $3x+5y\leq -10$

50. $3x+4y\geq 12$

Find the slope of the line passing through the points.

51. $(3,-8)$ and $(-5,2)$

52. $(-10,-3)$ or $(7,2)$

53. $(-7,-6)$ and $(3,-6)$

54. $(8,2)$ and $(8,-5)$

55. $(6,1)$ and $(8,-4)$

56. $(-6,-5)$ and $(4,1)$

Write the equation of the line described.

57. Slope $= -5$, passes through $(-3,-8)$

58. Slope $= \frac{4}{5}$, passes through $(10,-3)$

59. Slope $= -\frac{1}{2}$, passes through $(2,-3)$

60. Slope $= \frac{5}{3}$, passes through $(-6,-2)$

61. Passes through $(4,3)$ and $(7,-2)$

62. Passes through $(-6,-3)$ and $(-8,4)$

63. Passes through $(3,11)$ and $(-6,5)$

64. Passes through $(7,2)$ and $(3,-5)$

65. Passes through $(6,1)$ and $(8,-4)$

66. Passes through $(3,2)$ and $(5,3)$

67. x-intercept $= -5$, y-intercept $= 7$

68. x-intercept $= 3$, y-intercept $= 2$

69. Passes through $(-8,2)$ and parallel to $5x - 4y = 1$

70. Passes through $(10,5)$ and perpendicular to $5x + 4y = 8$

71. Passes through $(-9,5)$ and perpendicular to $y = -3x + 2$

72. Passes through $(2,-3)$ and parallel to $7x + 2y = 5$

Determine the value of r so that the line through the given points has the given slope.

73. $(r,2)$, $(4,-6)$; Slope $= -\frac{8}{3}$

74. $(5,r)$, $(2,3)$; Slope $= 2$

75. $(r,6)$, $(8,4)$; Slope $= \frac{1}{2}$

76. $(6,r)$, $(9,2)$; Slope $= \frac{1}{3}$

Find the value of k in each equation if the ordered pair is a solution to the equation.

77. $5x + ky = 8$, $(3,-1)$

78. $4x - ky = 7$, $(4,3)$

79. $3x + 8y = k$, $\left(0,\frac{1}{2}\right)$

80. $kx + 3y = 11$, $(7,2)$

Algebra 2 with Trigonometry Honors Summer Notes

I. Solving Equations and Inequalities:

A. Equations

1. Distribute if necessary.
2. Combine like terms on each side separately
3. If there is a variable on both sides, move the smaller variable term.
4. Undo any adding and subtracting
5. Undo any multiplication and division.
6. If the variables drop out and leave a true statement there are infinitely many solutions; if it leaves a false statement there is no real solution.

Example:

$$\begin{aligned} 2(6d+3) &= 18-3(16-3d) \\ 12d+6 &= 18-48+9d \\ 12d+6 &= 9d-30 \\ 3d+6 &= -30 \\ 3d &= -36 \\ d &= -12 \end{aligned}$$

B. Absolute Value Equations

1. Get the $|\text{variable expression}|$ by itself.
2. Set up two equations:
   - without the absolute value, equal to the positive.
   - without the absolute value, equal to the negative.
3. Solve each equation.

Example:

$$\begin{aligned} |4p-3|-2 &= 5 \\ +2 &= +2 \\ |4p-3| &= 7 \end{aligned}$$

then:

$$\begin{aligned} 4p-3 &= 7 \\ +3 &= +3 \\ \frac{4p}{4} &= \frac{10}{4} \\ p &= \frac{5}{2} \end{aligned}$$

or

$$\begin{aligned} 4p-3 &= -7 \\ +3 &= +3 \\ \frac{4p}{4} &= \frac{-4}{4} \\ p &= -1 \end{aligned}$$

C. Inequalities:

1. Same as equalities, but when multi[plying or dividing both sides by a negative, flip the inequality sign.

Example:

$$\begin{aligned} -3(2x-5)+4 &< -23 \\ -6x+15+4 &< -23 \\ -6x+19 &< -23 \\ -6x &< -42 \\ x &> 7 \end{aligned}$$

Algebra 2 with Trigonometry Honors Summer Notes

I. Solving Equations and Inequalities:

D. Compound Inequalities

1. "AND" solve all 3 "sides"; answers are written *lower value* $< x <$ *upper value*

Example:
$$-14 \le -m - 6 \le -8$$
$$-8 \le -m \le -2$$
$$8 \ge m \ge 2$$
$$2 \le m \le 8$$

2. "OR" Solve both, answer must have "or"

Example: $7 - 2y < 1$ or $3y + 10 < 4 - y$

$$7 - 2y < 1 \quad \text{or} \quad 3y + 10 < 4 - y$$
$$-2y < -6 \qquad\qquad 4y + 10 < 4$$
$$y > 3 \qquad\qquad 4y < -6$$
$$y < -\frac{3}{2}$$
$$y > 3 \text{ or } y < -\frac{3}{2}$$

E. Absolute Value Inequalities

1. Get the $|\text{variable expression}|$ by itself.
2. Set up two inequalities:
   - without the absolute value, unchanged inequality, positive.
   - without the absolute value, flipped inequality, negative.
3. Solve each inequality.
4. Answers are written as a compound inequality.
   - $|\text{variable expression}| <$ is an "and"
   - $|\text{variable expression}| >$ is an "or"

Example: $|2x - 9| - 3 \le 24$

$$|2x - 9| \le 27$$
$$-27 \le 2x - 9 \le 27$$
$$-18 \le 2x \le 36$$
$$-9 \le x \le 18$$

Example: $|2x + 4| + 7 > 19$

$$|2x + 4| \ge 12$$
$$2x + 4 \ge 12 \text{ or } 2x + 4 \le -12$$
$$2x \ge 8 \text{ or } 2x \le -16$$
$$x \ge 4 \text{ or } x \le -8$$

Algebra 2 with Trigonometry Honors Summer Notes

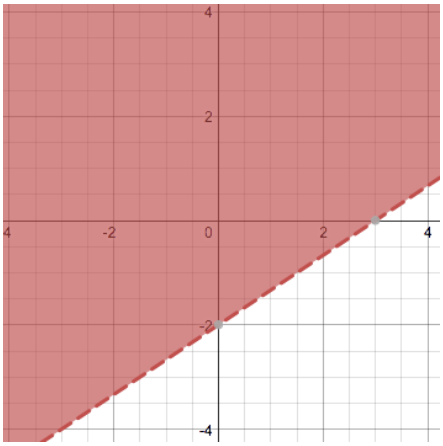
II. Linear Equations:

A. Graphing Linear Equations & Inequalities

1. Get into $y = mx + b$ form
   a. If the y-term is negative, change all signs, both sides. If it is an inequality, also flip the inequality sign.
   b. Move the x term to the other side.
   c. Divide each term, both sides by the y-coeffcient
2. Graph
   a. Mark b on the y-axis
   b. Count m. Count up or down the numerator, right the denominator, mark point. Repeat if necessary.
   c. Connect the dots. If it is an inequality without the "or equal to" dash the line.
   d. If it is a greater than, shade above; a less than, shade below.

Example:

$$2x - 3y < 6$$
$$-2x + 3y > -6$$
$$3y > 2x - 6$$
$$y > \frac{2}{3}x - 2$$



B. Slope

1. Slope is a rate of change. It is the defined as : $\frac{change\ in\ vertical(y)}{change\ in\ horizontal(x)}$

2. To find from two points remember 3 things:
   a. Y's on top
   b. Same pairs vertical
   c. Subtract. Always put the negatives in last so not to lose any double negatives.

Example: Find the slope of the line connecting $(2,-3)$ and $(-5,3)$.

$$\frac{-3-3}{2--5} = \frac{-6}{7} \text{ therefore the slope is } -\frac{6}{7}$$

Algebra 2 with Trigonometry Honors Summer Notes

II. Linear Equations:

C. Writing Linear Equations

1. Given a point and the slope:
   a. Substitute x, y, and m into $y = mx + b$
   b. Solve for b
   c. Rewrite the equation with x and y as variables and m and b as constants.
2. Given two points:
   a. Find the slope. (See above, section II.B.)
   b. Pick ONE point and substitute x, y, and m into $y = mx + b$
   c. Solve for b
   d. Rewrite the equation with x and y as variables and m and b as constants.

Example: Write the equation of the line passing through $(2,3)$ and $(1,5)$.

Slope: $\frac{3-5}{2-1} = \frac{-2}{1}$ y-intercept: $y = mx + b$, $3 = -2(2) + b$, $3 = -4 + b$, $7 = b$ Answer: $y = -2x + 7$

3. Given a parallel or perpendicular line and a point
   a. The ONLY thing you take from the given equation is the slope. If the line is parallel, keep the slope, if it is perpendicular, take the negative reciprocal (flip and change).
   b. Substitute x, y, and m into $y = mx + b$
   c. Solve for b
   d. Rewrite the equation with x and y as variables and m and b as constants.

Example: Write the equation of the line perpendicular to $y = 2x + 5$ and passing through the point $(6,3)$.

The slope of the given line is 2, therefore the perpendicular slope is $-\frac{1}{2}$.

$y = mx + b$

$3 = -\frac{1}{2}(6) + b$

$3 = -3 + b$

$6 = b$

Answer: $y = -\frac{1}{2}x + 6$