

## Summer 2023- Preparation for Geometry Honors

These skills are necessary for preparation of Geometry Honors next year. You will be expected to complete these problems without a calculator and formula chart at the start of the new year and throughout the year. These problem sets are to be completed and brought with you at the start of school next year. This is required prep work.

### Solving Equations

1. Solve for  $x$ .  $-\frac{3}{4}(-8x + 12) + 4 = \frac{1}{2}(-20x - 10)$
2. Solve for  $x$ :  $\frac{8x}{3} = 120$
3. Solve for  $x_2$ :  $P = \frac{x_1 + x_2}{4b} \cdot m$
4. Solve for  $l$ :  $\frac{1}{2}Pl = S$
5. Given  $f(x) = \frac{1}{3}(4 - x)^2$ , what is the value of  $f(-16)$ ?

### Simplifying Polynomials

6. Simplify the following:  $2q^2 - \frac{5}{3}(3q - 2) + 9q^2$
7. Simplify the following:  $\frac{1}{2}g^2 + \frac{7}{2} + 3g^2 - \frac{4}{5}g + \frac{1}{4}$
8. Simplify the following:  $\frac{1}{3}g^2 + \frac{7}{3} - \left(2g^2 - \frac{2}{5}g + \frac{1}{2}\right)$
9. Simplify the following:  $(9x + 1)^2$

### Solving Systems

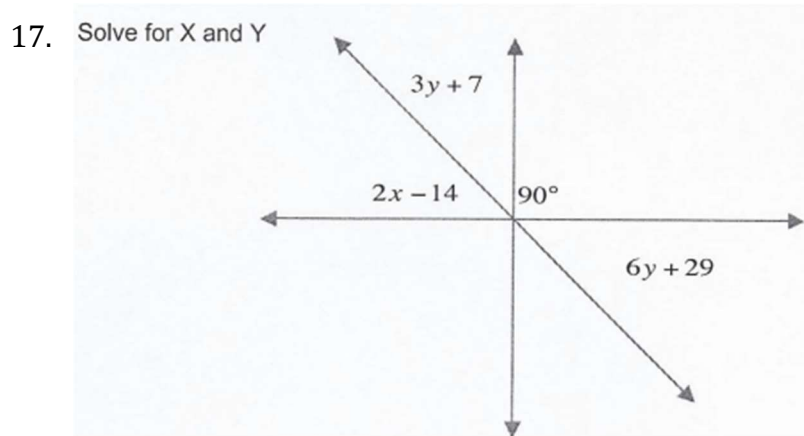
10. What is the solution to this linear system of equations?  
$$2x = 4y$$
$$-4x + 4 = -4y$$
11. A group of students go out to dinner. If 4 have pizza and 8 have pasta, the bill will be \$72. If 8 have pizza and 4 have pasta, the bill will be \$48. Solve the system of linear equations to determine the price of the pasta.
12. Molly and Stefan are selling cookie dough for a school fundraiser. Customers can buy packages of sugar cookie dough and packages of gingerbread cookie dough. Molly sold 7 packages of sugar cookie dough and 1 package of gingerbread cookie dough for a total of \$75. Stefan sold 14 packages of sugar cookie dough and 12 packages of gingerbread cookie dough for a total of \$270. Write a system of equations to find the cost of each type of cookie.

13. Solve the system.  $\begin{cases} y = 2x - 4 \\ y - 2x = 15 \end{cases}$

14. Solve the system.  $\begin{cases} 3x + 6y = 15 \\ 2x + 5y = 12 \end{cases}$

15. Solve.  $\begin{cases} 5x + 9y + 5y - 35 = 180 \\ 5y - 35 = 45 - 2x \end{cases}$

16. Solve.  $\begin{cases} 36 = x + y \\ 3y + 24 = 9x \end{cases}$



### Linear Functions

18. Find the slope of the line segment between the points A and B:  $A(6, 11)$  and  $B(-4, -1)$ .

19. Write a linear equation in point-slope form given the information below:

$$\text{slope} = \frac{1}{2}, \text{ going through } (2, -4)$$

20. Write the linear equation of the line with the given information.

$$m = \text{undefined}, \text{ going through } (0, 0)$$

21. Write the linear equation,  $g(x)$ , that is **parallel** to the given equation and going through the given coordinate point A.

$$3x + y = 10; A(2, -1)$$

22. Write the equation of the line  $g(x)$ , that is **perpendicular** to the given equation and going through the given coordinate point B.

$$f(x) = -4x + 6; B(-8, 5)$$

23. What is the slope of the line in the  $xy$  - plane that passes through the points  $(-\frac{5}{2}, 1)$  and  $(-\frac{1}{2}, 4)$ ?

24. What is the linear equation that passes through the point  $(-2, 7)$  and has a slope of zero?

25. Write all three forms of the linear equation that passes through the coordinates

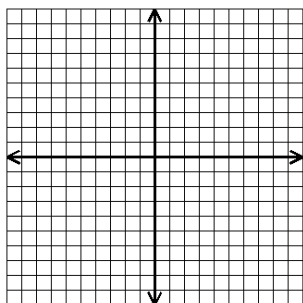
$$A(-\frac{2}{5}, \frac{3}{8}) \text{ and } B(\frac{1}{2}, \frac{1}{3}). \text{ No decimals.}$$

26. What are the domain and range restrictions on the line in #24 so that it is a line segment  $\overline{AB}$ ?

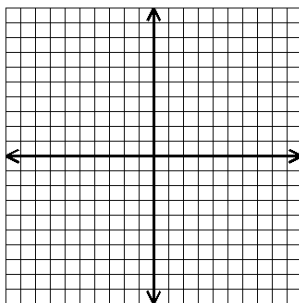
27. Write the equation for  $\overline{AM}$ , given  $A(2, -1\frac{3}{4})$  and  $M(-1\frac{1}{3}, \frac{1}{8})$ .

Graph the following:

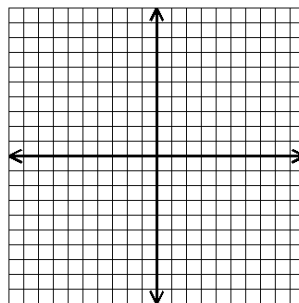
28.  $y - 3 = \frac{3}{2}(x + 2)$



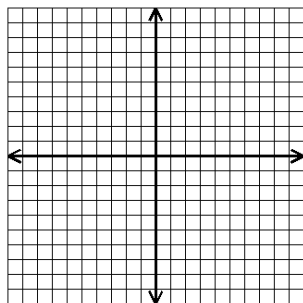
28.  $x = 3$



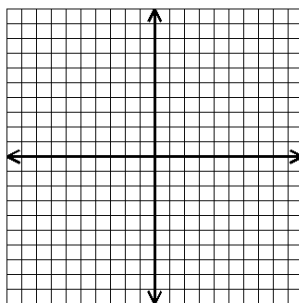
29.  $f(x) = -5$



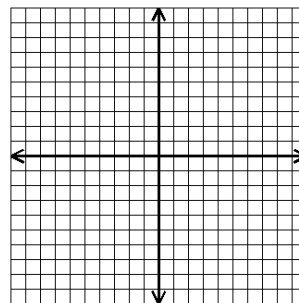
30. Parent Linear Function



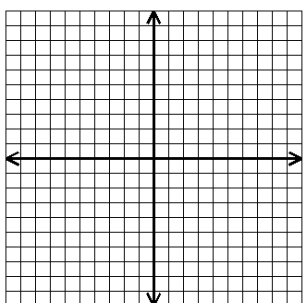
31.  $f(x) = -x$



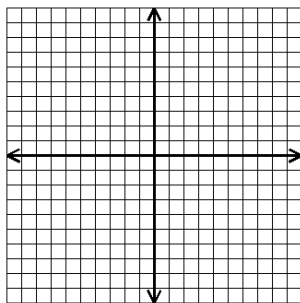
32.  $x = 0$



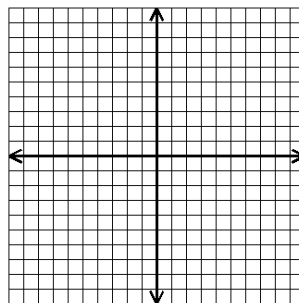
33.  $f(x) = 0$



34. Parent Quadratic Function

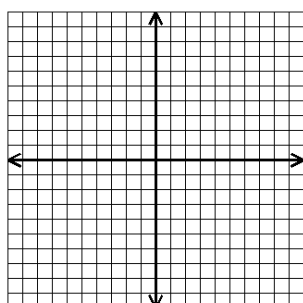


35.  $f(x) = -(x - 4)^2 + 3$



36.  $f(x) = \frac{3}{2}(x + 2) - 4$ ;

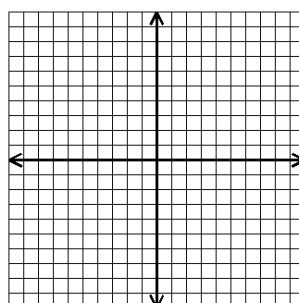
Domain Restriction of  $-3 < x \leq 2$



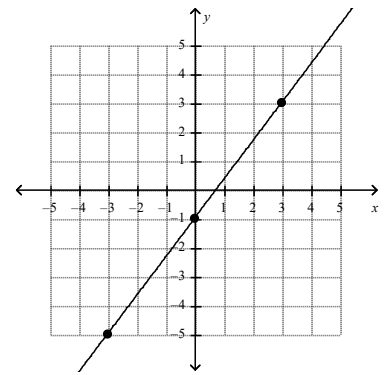
37.  $f(x) = \frac{1}{2}(x + 4)^2 - 5$ ;

domain restriction of  $-4 < x \leq 3$

range restriction of  $-5 \leq y \leq 5$



Write the equation of the line in all three forms for the graph to the right.



29. Slope-intercept form.

30. Point-slope form.

31. Standard form.

### Quadratic Functions

29. Using the quadratic formula, find the solutions:  $-2x^2 = -7x - 4$  Leave answer in EXACT simplified form.

30. Factor the following:  $10x^2 - 11x = 6$

31. Solve the quadratic function:  $x^2 - 2x - 3 = 0$

32. Solve using the quadratic formula:  $4x^2 - 20x = -25$  Leave answer in EXACT simplified form.

32. Factor the trinomial:  $x^2 - 12x + 35$

33. Solve by completing the square:  $x^2 + 4x = 32$

34. Solve by completing the square:  $x^2 - 6x - 22$  Keep answer in EXACT form.

35. Solve:  $2x^2 + 3x + 4x - 5 = 10$

36. Solve:  $(9x + 1)^2 = 16$

37. Solve:  $(4x + 9)^2 = 54$

38. Solve:  $x^2 - 8 = 4$

39. Solve:  $x^2 + -9x = 70$

40. Solve:  $\frac{x^2+2x^2+7x}{2} = 6x + 1$

41. Solve:  $x^2 + (x + 7)^2 = (x + 9)^2$

42. Solve:  $2x^2 + 60 - 10x + 38 = 95$

### Simplifying Radicals

Simplify. Keep answers in simplified radical form.

43.  $\sqrt{98}$

44.  $8\sqrt{3} \cdot 6\sqrt{3}$

45.  $3\sqrt{45} + 7\sqrt{36}$

46.  $-3\sqrt{72} + 6\sqrt{52} - 7\sqrt{128}$

47.  $(4\sqrt{2})^2 + 8\sqrt{2}$

48.  $\sqrt{\frac{20}{6}}$

49.  $10\sqrt{6} \cdot \frac{20\sqrt{6}}{\sqrt{3}}$

50. Solve for  $g$ :  $3g - 3 = \frac{18}{\sqrt{3}}$

51. Solve for  $h$ :  $h\sqrt{2} = \frac{9}{\sqrt{3}}$

Geometry Skills Learned in Middle School Math:

Define and sketch the following angle pair relationships:

52. Linear Pair

53. Supplementary Angles

54. Complementary Angles

55. Vertical Angles

56. Parallel lines with Alternate Interior Angles

57. Parallel Lines with Alternate Exterior Angles

58. Parallel Lines with Consecutive Interior Angles

59. Parallel Lines with Consecutive Exterior Angles

60. Parallel Lines with Corresponding Angles

Geometry Formulas to Know and Use:

61. Perimeter and Area of each of the following: triangle, rectangle, square, parallelogram, circle, trapezoid