Honors Pre-Calculus

Summer Readiness Packet

This packet includes material from Algebra 2 and Geometry. You will be tested on this material during the first week of class. There may be some terms in this packet that you do not remember, but that's okay. It is then your responsibility to look them up. By the end, you should be comfortable with these questions.

The summer skills assigned will not be graded or collected, also the answers are provided, so there is no reason to copy work from someone else or use any other method of cheating. Remember, this packet is to help YOU be ready for Pre-Calculus. Again, you will have an assessment during the first week of classes. Your specific questions will be answered, but teachers will not review every question.

Have a great summer and see you in September,

Mrs. Jenson and Mrs. Gabor

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Solving Equations:

Solve each equation below.

1. $7x - 3(x + 6) = -2$	2. $7(x + 5) - 3 = 3(x + 8)$	3. $2x(x + 3) = 2x^2 + 2x + 6$

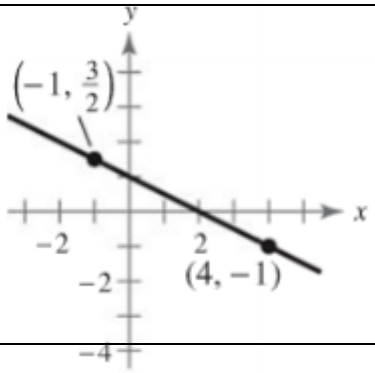
Solve each equation below, by **factoring**.

4. $x^2 + 3x + 2 = 0$	5. $x^2 - 6x + 9 = 0$
6. $x^2 + 6x - 7 = 0$	7. $x^2 - 11x + 180 = 0$
8. $x^2 + 5x = 0$	9. $3x^3 - 27x^2 = 0$
10. $x^2 - 25 = 0$	11. $4x^2 - 25 = 0$
12. $2x^3 - 12x^2 + 16x = 0$	13. $x^3 + x^2 - 9x - 9 = 0$

Lines and Linear Equations:

14. What do you know about the slopes of: i. parallel lines? ii. perpendicular lines? iii. vertical lines? iv. horizontal lines?	15. For the equation of a line, what is the: i. slope-intercept form? ii. point-slope form? iii. standard form?

Write the equation for each line below. Be sure to consider the given information and use the appropriate form of the equation.

16. crosses the point (0 , -4) and slope = 2	17. passes through the point (3 , -7) and has a slope of 2
18. crossed the points (1 , 1) and (2 , -1)	19. passes through $(2 , \frac{1}{2})$ and $(\frac{1}{2} , \frac{5}{4})$
20. has a zero slope and passes through the point (-5 , 3)	21. perpendicular to the line with the equation $2x - 3y = 5$ and passes through the point (7 , 4)
22. has an undefined slope and passes through the point (-5 , 3)	23. 

Systems of Linear Equations:

Solve the system of equations below.

24. $\begin{cases} x + y = 19 \\ 5x - y = 23 \end{cases}$	25. $\begin{cases} 4x + 3y = 18 \\ x + y = 3 \end{cases}$

Functions:
Their Graphs, Properties, and Characteristics

26. When given an equation for a function, explain how to find the…

a. x-intercept	b. y-intercept

Algebraically find the exact coordinates of the x and y intercepts for the given functions. Show work and write your answers as ordered pairs.

27. $f(x) = 3x - 7$	28. $h(x) = (x - 10)(x + 3)$
x-int(s): _____ y-int: _____	x-int(s): _____ y-int: _____

Find $f(2)$.

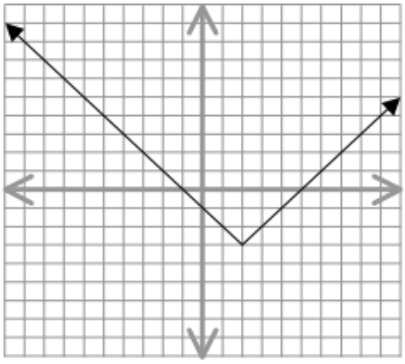
29. $f(x) = 2x^2 - 8x$	30. $f(x) = \frac{2x-3}{x^2+1}$
$f(2) =$ _____	$f(2) =$ _____

31.

x	f(x)
-1	5
0	3
1	-8
2	-10
3	-4
4	0

$f(2) =$ _____

32.

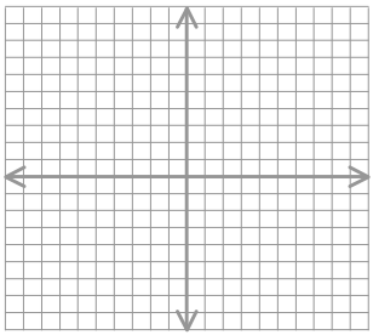


$f(2) =$ _____

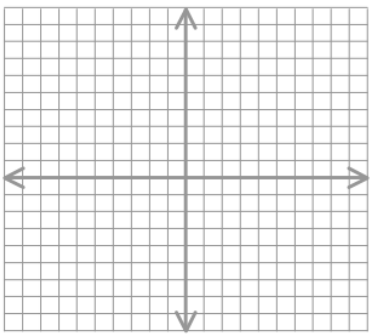
33. For some function f, if $f(2) = 0$, what does this tell you about the graph of the function?

Graph each equation.

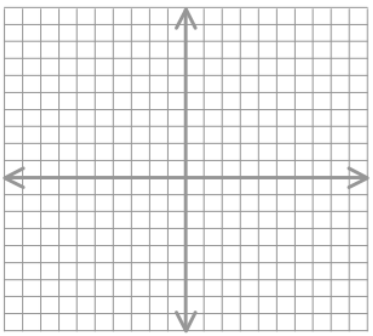
34. $x + y = 4$



35. $y = -2x^2$



36. $y = -\frac{1}{2}x^2 + 8$



If $f(x) = 3x + 2$ and $g(x) = x^2 - 2x$, find…

37. $f(x) + 2g(x)$

38. $g(x) - f(x)$

39. $f(x) \cdot g(x)$

Answer each of the following.

40. Define/Explain domain.

41. Define/Explain range.

42. Explain why the domain of $f(x) = \sqrt{x - 5}$ is all real numbers greater than or equal to 5.

Give the domain and range for each function shown below. Use your graphing calculator and your understanding of functions to help you. You may use interval, inequality, or list notation.

43. $(0\ ,\ 1)\ ,\ (1\ ,\ -2)\ ,\ (2\ ,\ 0)\ ,\ (3\ ,\ 2)\ ,\ (4\ ,\ 4)$

D: _____

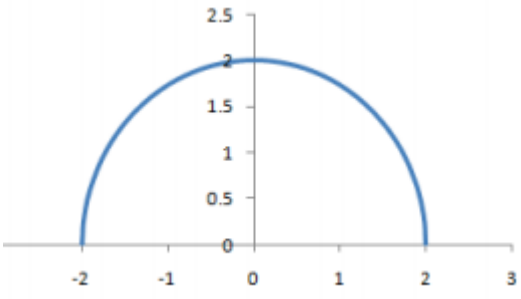
R: _____

44. $f(x) = 2x^2 + 4$

D: _____

R: _____

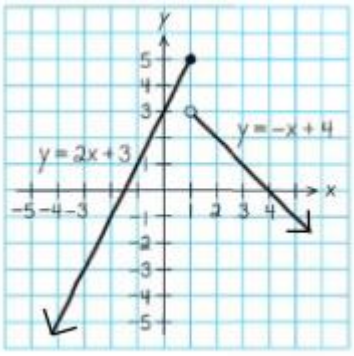
45.



D: _____

R: _____

46.



D: _____

R: _____

Simplifying Algebraically:

Answer each question below.

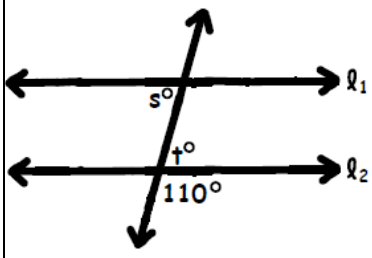
47. Solve for x in the equation: $z = bx + cy$

48. Solve for n in the equation: $bn = n + a$

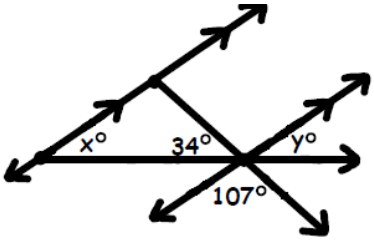
Geometry:

Find the value of the variable in each diagram below. Fully simplify your answers.

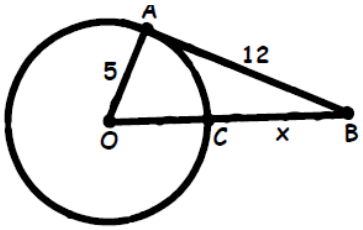
49. Find s and t.



50. Find x and y.

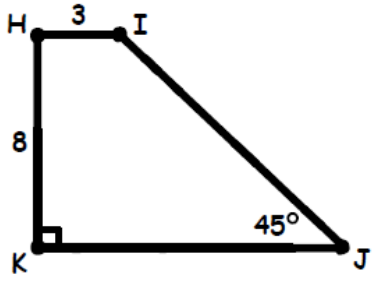


51. Find x.

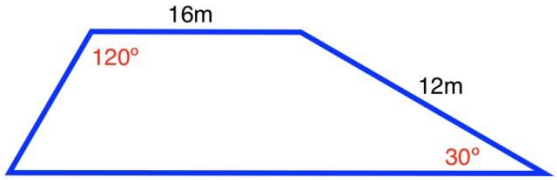


Find the perimeter of each quadrilateral. Write your answer as an expression in exact radical form and as a decimal rounded to the nearest hundredth.

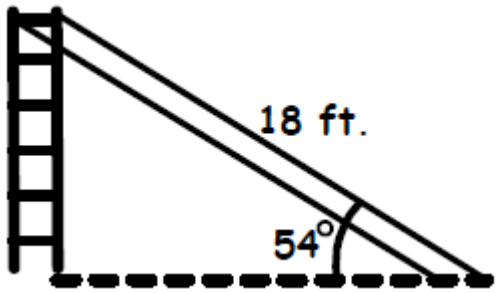
52.



53.



54. The playground in the local park has a tall slide that is 18 feet long. If the end of the slide forms a 54° angle with the ground, how tall is the slide? Round your answer to the nearest hundredth.



55. In $\Delta MNG,\ m\angle M = 4x,\ m\angle N = 3x + 12,\ m\angle G = x - 8$ (where $x>0$).
Find $m\angle N$. What is the longest side of ΔMNG?

Exponents:

56. Taking the square root of a number is the same thing as raising that number to what power?

57. Write the following exponential expressions in fraction form.

a. 2^{-1}	b. 5^{-2}	c. x^{-3}

Random:

58. Why are you taking PreCalculus?

ANSWER KEY

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

4. $\{-1, -2\}$	5. $\{3\}$
6. $\{1, -7\}$	7. $\{9, -20\}$
8. $\{0, -5\}$	9. $\{0, 9\}$
10. $\{\pm 5\}$	11. $\{\pm \frac{5}{2}\}$
12. $\{0, 2, 4\}$	13. $\{-1, \pm 3\}$

14. What do you know about the slopes of: v. parallel lines have equal slopes vi. perpendicular lines have slopes that are negative reciprocals vii. vertical lines have no slope (undefined) viii. horizontal lines have slope of zero	15. For the equation of a line, what is the: iv. slope-intercept form $y = mx + b$ v. point-slope form? $y - y_1 = m(x - x_1)$ vi. standard form? $Ax + By = C$

16. $y = 2x - 4$	17. $y + 7 = 2(x - 3)$
18. $y - 1 = -2(x - 1)$ OR $y + 1 = -2(x - 2)$	19. $y - \frac{1}{2} = -\frac{1}{2}(x - 2)$ OR $y - \frac{5}{4} = -\frac{1}{2}(x - \frac{1}{2})$
20. $y = 3$	21. $y - 4 = -\frac{3}{2}(x - 7)$
22. $x = -5$	23. $y = -\frac{1}{2}x + 1$

24. $(7, 12)$	25. $(9, -6)$

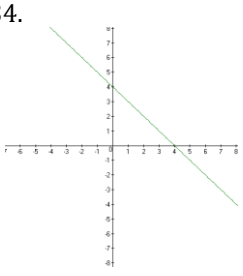
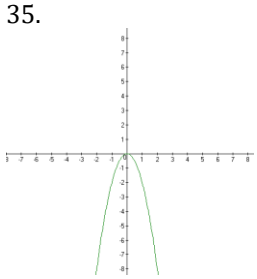
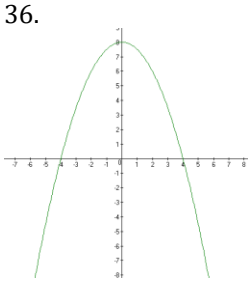
26.

a. To find an x-intercept, plug in 0 for y, and solve for x.	b. To find a y-intercept, plug in 0 for x, and solve for y.

27. x-int(s): $(\frac{7}{3}, 0)$ y-int: $(0, 7)$	28. x-int(s): $(10, 0)$, $(-3, 0)$ y-int: $(0, -30)$

29. $f(2) = -8$	30. $f(2) = \frac{1}{5}$
31. $f(2) = -10$	32. $f(2) = -3$

33. $f(2) = 0$ tells you that the graph of the function crosses the x-axis at $(2, 0)$.

34. 	35. 	36. 

37. $2x^2 - x + 2$	38. $x^2 - 5x - 2$	39. $3x^3 - 4x^2 - 4x$

40. The domain of a function is the complete set of possible values of the independent variable. In other words, the domain is the set of all possible x-values which will make the function "work", and will output real y-values.	41. The range of a function is the complete set of possible values of the dependent variable. In other words, the range is the set of all possible y-values which will make the function "work" under an input of real x-values.	42. You cannot take the square root of a negative number, therefore, $x - 5 \geq 0$. This leads to the inequality $x \geq 5$.

43. D: 0, 1, 2, 3, 4 R: -2, 0, 1, 2, 4	44. D: all real numbers R: $x \geq 4$
45. D: $-2 \leq x \leq 2$ R: $0 \leq y \leq 2$	46. D: all real numbers R: $y \leq 5$

47. $x = \frac{z-cy}{b}$	48. $n = \frac{a}{b-1}$

49. $s = t = 70$	50. $x = y = 39$	51. $x = 8$

52. $p = 22 + 8\sqrt{2} \approx 33.31$	53. $p = 44 + 12\sqrt{3} \approx 64.78$

54. 14.56 feet

55. $m\angle N = 78$; $\overline{NG}$ is the longest side.

56. ½

57.

a. $\frac{1}{2}$	b. $\frac{1}{25}$	c. $1/x^3$

58. Why are you taking PreCalculus? This one is just to get you thinking ☺