

**Robbinsville High School**  
**Mathematics Department**  
155 Robbinsville-Edinburg Road  
Robbinsville NJ 08691

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Dear Students,

Welcome to Calculus! Attached you will find a summer packet for math reinforcement for the upcoming 2019-2020 school year. This packet should be completed and returned to school on the ***first full day of school***. September is filled with review, but with completion of this packet, the review will come very naturally. The packet will be ***collected*** and ***graded as a 20-point homework grade*** based on ***completion*** and ***effort***.

To assist in your review and completion of this packet there are videos corresponding to each section of this packet. The videos are linked into this packet using QR codes that look like this:



In order to view the videos, simply download a QR scanner to your phone, use the scanner to scan the code, and that will directly link you to each video. To see the full collection of videos on your computer, go to:  
[www.vimeo.com/MangieriMath](http://www.vimeo.com/MangieriMath)

If you find yourself still confused on certain topics, it is suggested that you search for the topic on one of the following websites:

- ShowMe <http://www.showme.com>
- Khan Academy: <http://www.khanacademy.org/Math>
- Math TV: <http://www.mathtv.com>

We look forward to teaching you and getting to know you next year.

Have a great summer!

*Robbinsville High School Mathematics Department*

**Directions: Using the appropriate inverse operations, solve each equation. Be sure to check for extraneous solutions if applicable.**



1.  $\sqrt{4a + 17} = a - 1$

2.  $\sqrt{3x - 3} + 2 = \sqrt{2x + 2}$

3.  $\sqrt{2m + 21} = m + 3$

4.  $-5 = -r + \sqrt{4r - 24}$

5.  $-x + \sqrt{39 - 5x} = -9$

6.  $\sqrt{5n - 4} - 4 = \sqrt{4 - n}$

7.  $\frac{41}{5} = 8 + (14 - v)^{-\frac{1}{2}}$

8.  $-46 = -1 - 5(x + 1)^{\frac{2}{3}}$

9.  $8 + 2(2x - 4)^{\frac{2}{3}} = 440$

10.  $864 = 4(2a + 6)^{\frac{3}{2}}$

11.  $\frac{7x+3}{x^2-8x+15} + \frac{3x}{x-5} = \frac{1}{3-x}$

12.  $\frac{4(x-4)}{x^2-+2x-8} = \frac{4}{x+4}$

13.  $\frac{1}{2x} + \frac{3}{x+7} = \frac{-1}{x}$

14.  $\frac{9}{3x} = \frac{4}{x+2}$

15.  $\frac{1}{3}(10^{2x}) = 12$

16.  $25e^{2x+1} = 962$

17.  $3(12^{x-1}) - 7 = 2$

18.  $1000e^{-4x} = 75$

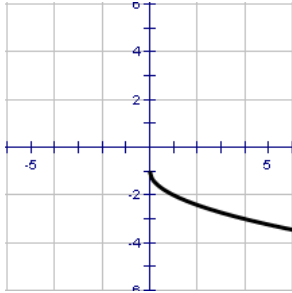
19.  $\log_2\left(\frac{x+5}{x-2}\right) = 3$

20.  $6 \ln(x + 1) = 2$

Directions: Identify the Parent Function, the intervals where the function is Increasing and Decreasing and the Domain and Range of the given function.

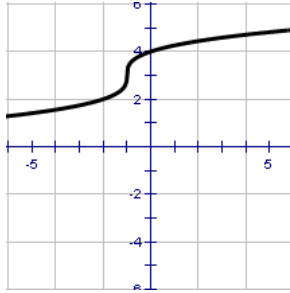


21.



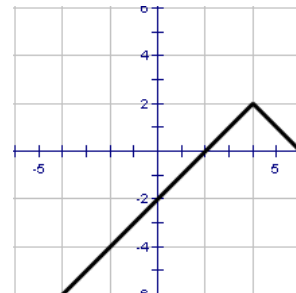
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22.



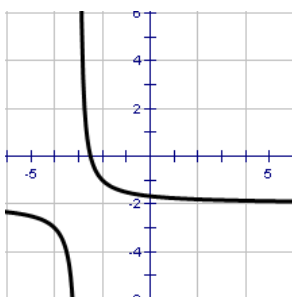
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23.



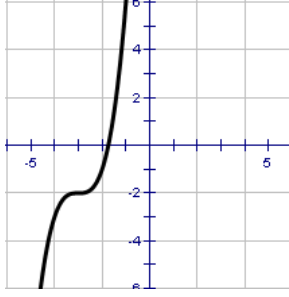
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24.



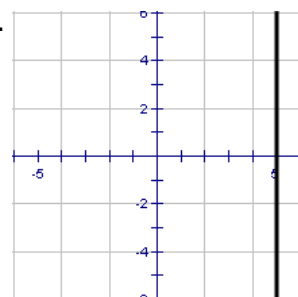
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25.



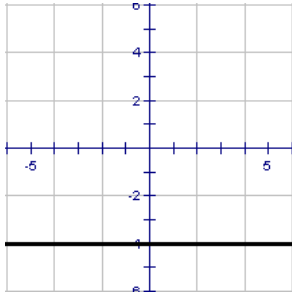
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 Decreasing: \_\_\_\_\_  
 Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_

26.



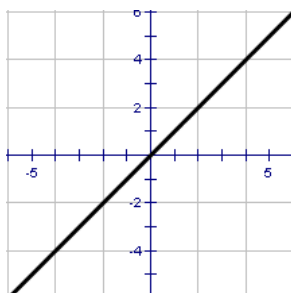
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 Increasing: \_\_\_\_\_  
 Decreasing: \_\_\_\_\_  
 Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_

27.



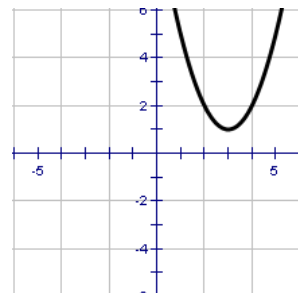
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 Increasing: \_\_\_\_\_  
 Decreasing: \_\_\_\_\_  
 Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_

28.



Name: \_\_\_\_\_  
 Increasing: \_\_\_\_\_  
 Decreasing: \_\_\_\_\_  
 Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_

29.



Name: \_\_\_\_\_  
 Increasing: \_\_\_\_\_  
 Decreasing: \_\_\_\_\_  
 Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_

Directions: Evaluate the function at each specified value of the independent variable and simplify.



30.  $g(t) = 4t^2 - 3t + 5$

$g(2) =$

$g(t-2) =$

$g(t) - 4g(2) =$

31.  $f(x) = \begin{cases} 3x - 1, & x \leq -1 \\ 4x, & -1 < x < 1 \\ x^2 + 1, & x \geq 1 \end{cases}$

$f(-2) =$

$f(-1/2) =$

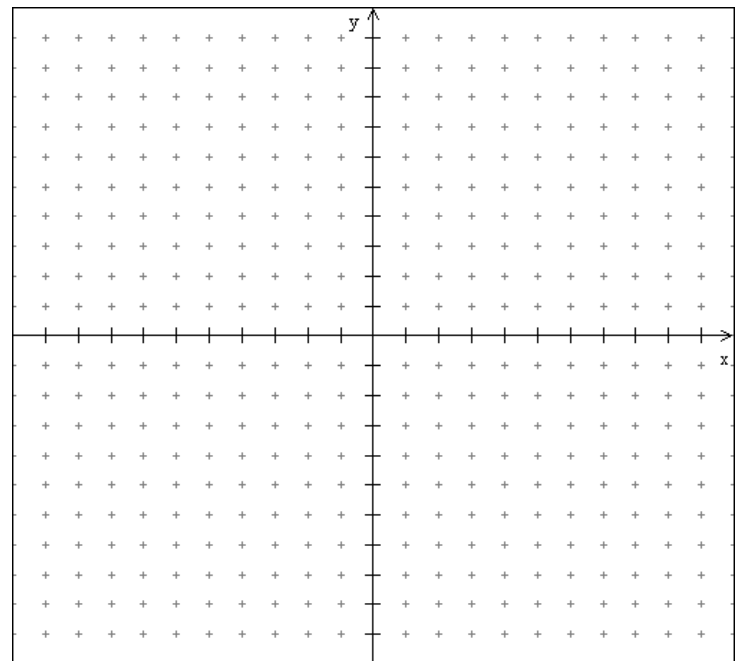
$f(3) =$

Directions: Graph the following piecewise functions and define the requested properties.

32. Piecewise equations:

Restrictions:

$$F(x) = \begin{cases} 3x - 2 & x \leq 2 \\ x^2 + 1 & -2 < x < 1 \\ 6 & x \geq 1 \end{cases}$$



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Increasing: \_\_\_\_\_

Decreasing: \_\_\_\_\_

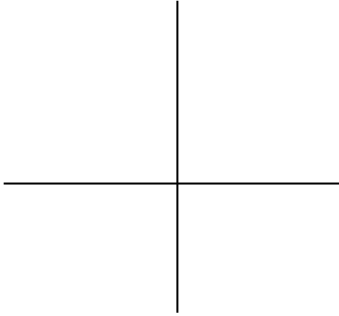
Constant: \_\_\_\_\_



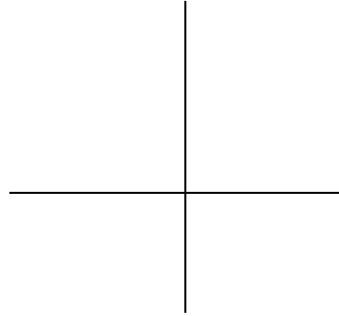
Directions: Sketch the graphs of the following without your calculator.



37.  $y = -\sqrt{x+2}$



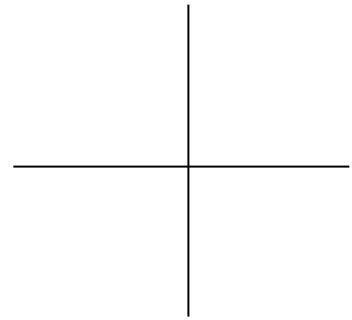
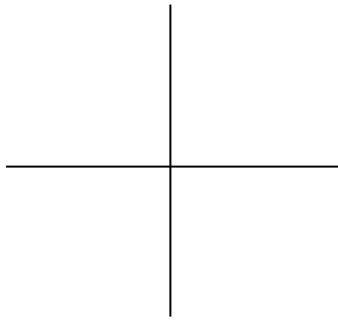
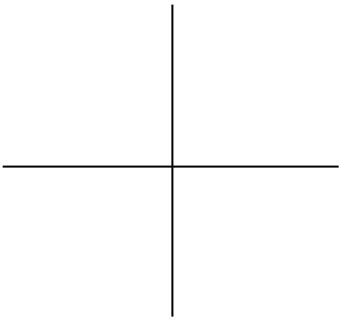
38.  $y = x^2 - 4$



39.  $y = \sqrt{x-3} + 2$

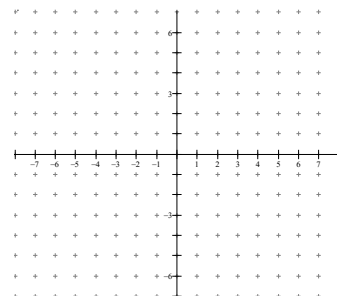
40.  $y = |x+1| - 2$

41.  $y = \sqrt[3]{x-2}$

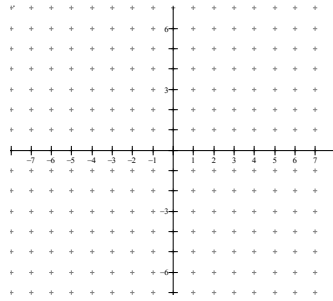


Directions: Determine the parent function, describe its transformations, and sketch:

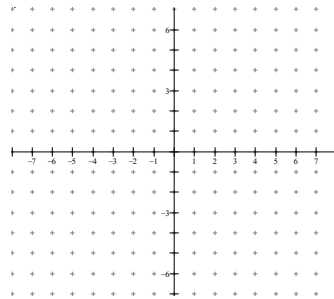
42.  $f(x) = -(x+10)^2 + 5$



43.  $f(x) = \frac{1}{2}\sqrt{3-x} + 2$



44.  $f(x) = 6 - |x + 5|$



**Directions: Find the distance between the points.**



45.  $(-3, 8), (1, 5)$

46.  $(-2, 6), (4, -3)$

47.  $(5.6, 0), (0, 8.2)$

**Directions: Find the line that passes through the given point with the given slope. Then find its perpendicular line through that same point.**



48. Point:  $(3, 0)$  Slope:  $m = \frac{2}{3}$

49. Point:  $(10, -3)$  Slope:  $m = -\frac{1}{2}$

50. Point:  $(-3, 1)$  Slope:  $m = 0$

Directions: Identify any x and y intercepts of each function.



51.  $f(x) = x^2$

52.  $f(x) = 4x^2 - 2$

53.  $f(x) = |x| + 4$

54.  $f(x) = x^3$

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

55.  $f(x) = 2x^3 + 1$

56.  $f(x) = \frac{1}{x}$

57.  $f(x) = \frac{1}{x^2} + 3$

58.  $f(x) = \ln(x)$

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

59.  $f(x) = e^x$

60.  $f(x) = \sin x$

61.  $f(x) = 2\cos x + 1$

62.  $f(x) = \tan x$

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

x-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

y-int \_\_\_\_\_

Directions: Find the inverse function of  $f$  analytically.



63.  $f(x) = \frac{4x+7}{2}$

64.  $g(x) = \sqrt{x+7} - 5$

65.  $h(x) = \frac{1}{8}(x+2)^2 - 1$



**Directions: Identify holes, vertical asymptotes, horizontal asymptotes, or slant asymptotes. Also identify any x-intercepts and y-intercepts.**



$$66. f(x) = -\frac{4}{x^2-3x}$$

Holes: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

$$67. f(x) = \frac{x-4}{-4x-16}$$

Holes: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

$$68. f(x) = \frac{x^3-9x}{3x^2-6x-9}$$

Holes: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

$$69. f(x) = \frac{3x^2-12x}{x^2-2x-3}$$

Holes: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

$$70. f(x) = \frac{x^2+5x+6}{x^2-9}$$

Holes: \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Horizontal Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_