

AP PRECALCULUS SUMMER PACKET

Welcome to AP Precalculus! I look forward to working with you this upcoming school year and preparing you to take the AP Precalculus Exam. While you are enjoying your summer, please take the time to complete the following assignment. This packet is designed to review concepts from Algebra 2 that will be needed for a smooth transition to AP Precalculus. It is expected that you are proficient on all of the material listed in this packet, as AP Precalculus is a rigorous and fast paced course. There will be very limited review of the following topics. The answers are at the end so that you can check your work. Please check your email for an invitation to our Google Classroom. I will use classroom to post links to video resources. If you feel like you do not remember a topic, please use the resources provided. Unless otherwise stated, all answers should be **exact**, no decimals. If you have any questions, feel free to reach out via email: melissa.prignoli@sayrevillek12.net

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

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

a. $f(-3)$

b. $-f(x)$

c. $f(2x)$

2. $f(x) = |x| - 4$

a. $f(-x)$

b. $f(x - 2)$

c. $f(3x)$

3. $f(x) = \sqrt{x^2 - 2x}$

a. $f(-3)$

b. $f(-x)$

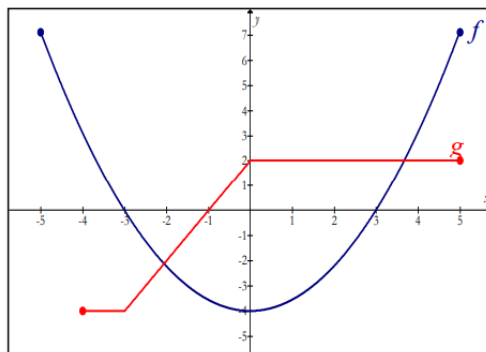
c. $-f(x)$

4. $f(x) = x^2 + 7$

$\frac{f(x+h)-f(x)}{h}, h \neq 0$

5. If $f(x) = 3x^3 + Bx^2 + 5x - 1$ and $f(-1) = -13$, what is the value of B?

6. Use the graph to estimate the value:



a) $f(-3) = \underline{\hspace{2cm}}$

b) $g(0) = \underline{\hspace{2cm}}$

Directions: Write each inequality in interval notation.

7. $x > 5$

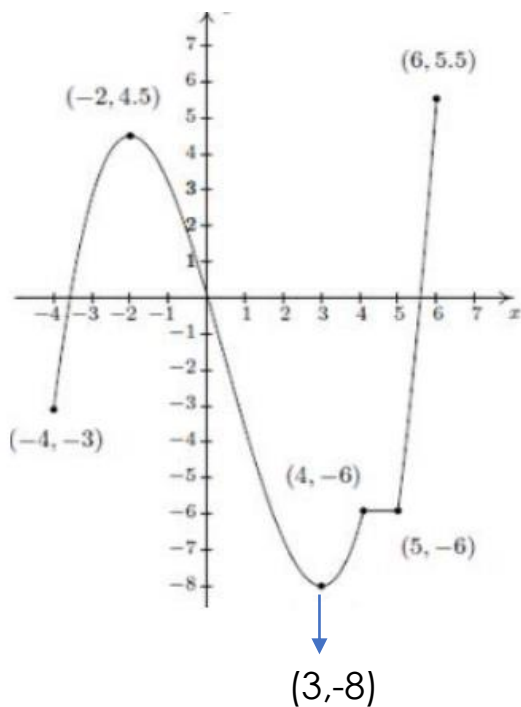
8. $x \leq -3$

9. $x > 8$ or $x \leq 3$

10. $-1 \leq x < 7$

Directions: Determine the interval(s) where the function is increasing, decreasing, or constant.

11.

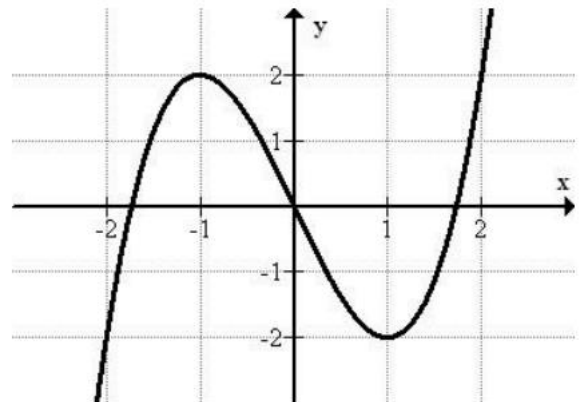


Increasing: _____

Decreasing: _____

Constant: _____

12.

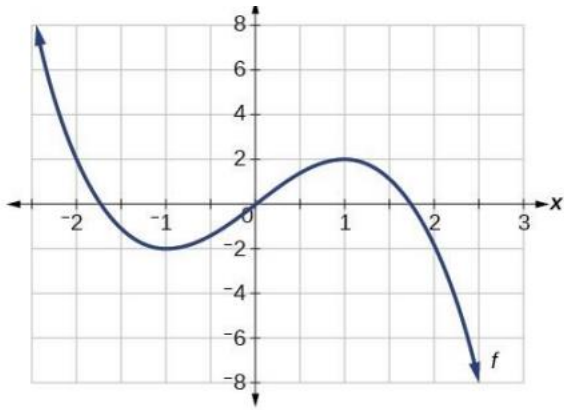


Increasing: _____

Decreasing: _____

Constant: _____

13.

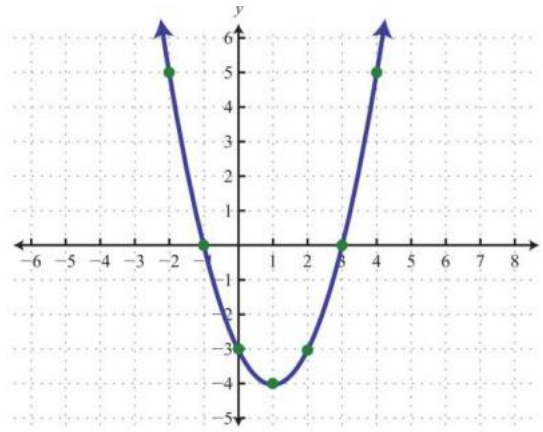


Increasing: _____

Decreasing: _____

Constant: _____

14.



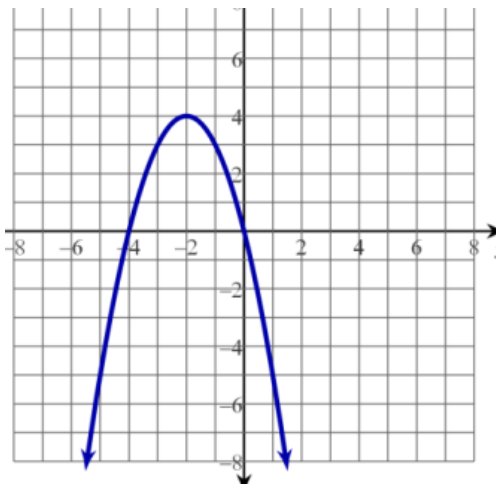
Increasing: _____

Decreasing: _____

Constant: _____

Directions: Write the domain and range of each function in interval notation.

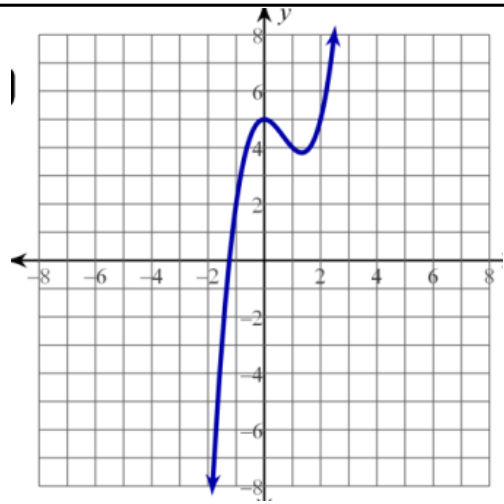
15.



Domain: _____

Range: _____

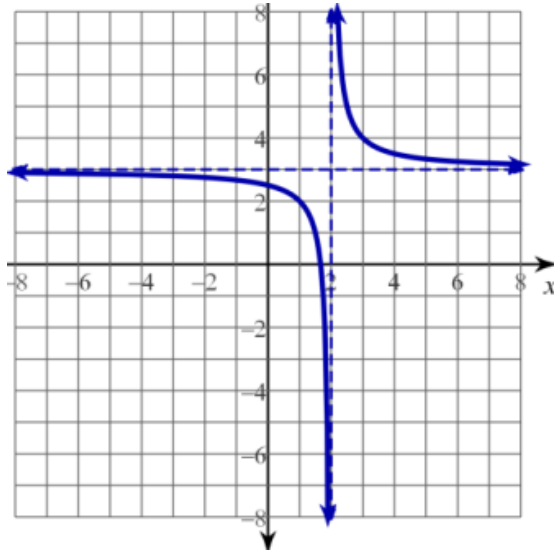
16.



Domain: _____

Range: _____

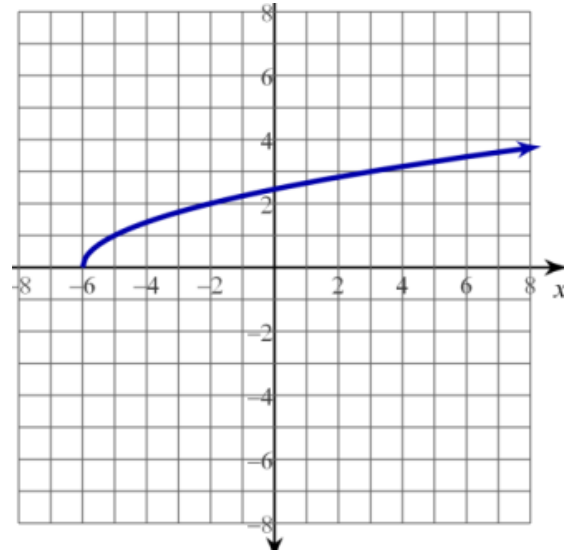
17.



Domain: _____

Range: _____

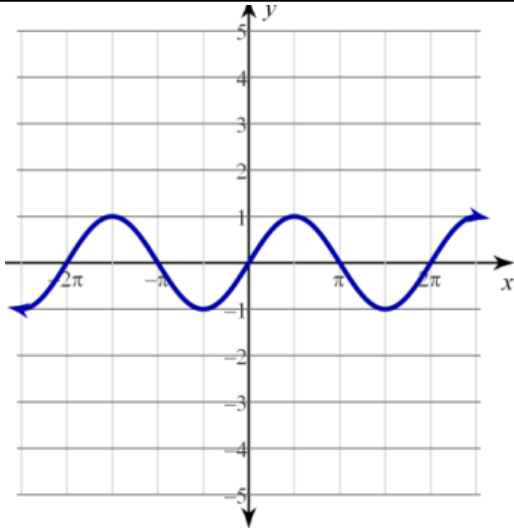
18.



Domain: _____

Range: _____

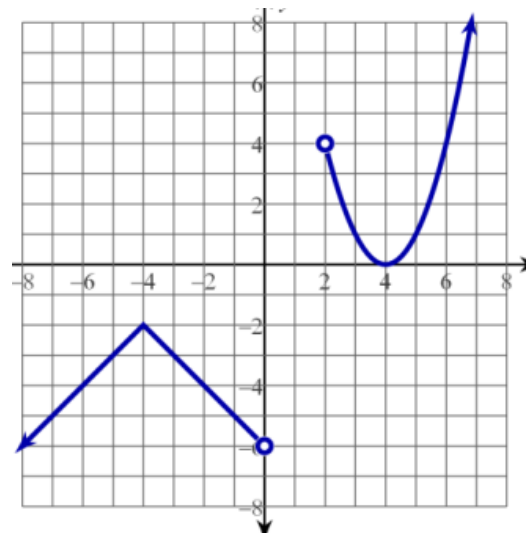
19.



Domain: _____

Range: _____

20.

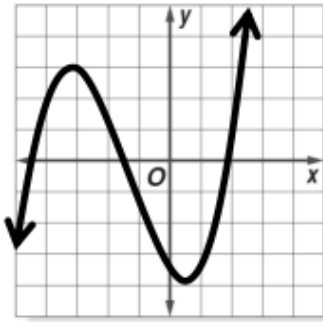


Domain: _____

Range: _____

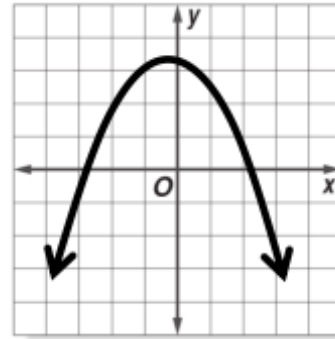
Directions: State the end behavior of for each.

21.



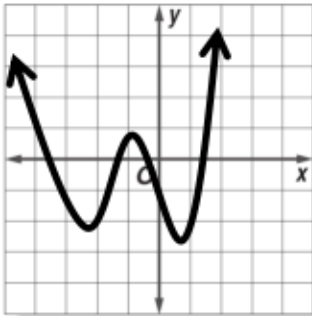
$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

22.



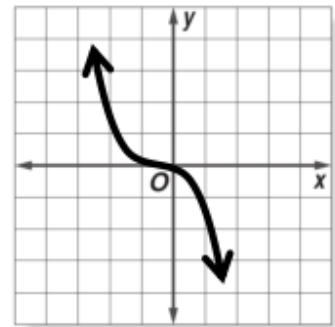
$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

23.



$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

24.



$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

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

$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

26. $f(x) = 2x^3 - 5x$

$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

27. $f(x) = -5x^4 - x + 7$

$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

28. $f(x) = 5x^2 - 4x - 8$

$x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

Directions: Factor each polynomial completely.

29. $36x^4 - 18x^3 - 9x^2$

30. $x^2 + x - 72$

31. $5x^2 - 18x + 9$

32. $3x^2 + 2x - 5$

33. $6x^2 - 7x - 3$

34. $81 - 4x^2$

35. $x^3 + 5x^2 - 9x - 45$

36. $42mc + 36md - 7n^2c - 6n^2d$

37. $x^4 - 2x^2 + 1$

38. $x^4 - 1$

39. $8u^3 + 1$

40. $27x^3 - 125y^3$

41. $x^2 + 16$

42. $16x^2 - 40x + 25$

43. $3x^4 - 9x^3 - 30x^2$

44. $15x^2 - x - 2$

Directions: Simplify each rational expression,

$$45. \frac{x^2+x-20}{x^2+2x-15}$$

$$46. \frac{4-x^2}{x^2+x-6}$$

47. State the zeros and the domain of:

$$f(x) = \frac{x-2}{x^2+2x-35}$$

48. For which values of x is the following expression undefined?

$$f(x) = \frac{5+x}{25-x^2}$$

$$49. \frac{3x^2+7x-6}{9x^2-4} \cdot \frac{15x^2+4x-4}{9-x^2}$$

$$50. \frac{4y^2-9}{2y^2+9y-18} \div \frac{2y^2+y-3}{y^2+5y-6}$$

$$51. \frac{\frac{x^2-1}{5x}}{\frac{x+1}{5x^2+10}}$$

$$52. \frac{\frac{3}{x+1} - \frac{4}{x}}{\frac{4}{x+1} + \frac{3}{x}}$$

Directions: Simplify the following expressions; assume no variable is equal to 0.

53. $(2x^4)^{-3}$

54. $\frac{5x^3y^9}{30x^4y^{-2}}$

55. $\frac{xy^9}{2y^2} \cdot \frac{-7y}{21x^{-5}}$

56. $\left(\frac{2a^3b}{a^2b^2}\right)^{-4}$

57. $\left(\frac{5x^7}{x^7y^6}\right)^0$

58. $a^2 \cdot a^{x+7} \cdot a^{x-3}$

Directions: Simplify each of the following. SHOW HOW TO REWRITE IT AS A RADICAL!

59. $\left(\frac{121}{100}\right)^{\frac{1}{2}}$

60. $(-32)^{\frac{4}{5}}$

61. $(-81)^{\frac{3}{4}}$

Directions: Rewrite as a fractional exponent.

62. \sqrt{x}

63. $\sqrt[4]{x^3}$

64. $\sqrt[5]{x}$

Directions: Perform the indicated operations. Write answers using only positive exponents.

65. $(4m^{\frac{2}{3}})(-3m^{\frac{5}{3}})$

66. $(2y^{\frac{3}{4}}z)(3y^{-2}y^{-\frac{1}{3}})$

67. $\left(\frac{x^4y^3z}{16x^{-16}yz^5}\right)^{\frac{1}{2}}$

68. $\left(\frac{x^{\frac{3}{2}}}{x^{\frac{1}{2}}}\right)^2$

69.
 $2\sqrt{12} - 3\sqrt{27} + \frac{1}{2}\sqrt{48} - 7\sqrt{8}$

70. $\frac{1}{3}\sqrt[3]{16} + \frac{3}{4}\sqrt[3]{54} - \frac{2}{5}\sqrt[3]{250}$

Directions: Solve the equation by factoring.

71. $27x^2 + 18x = 0$

72. $5x^2 - 32x - 21 = 0$

73. $x^2 + 3x = 10$

74. $2x^2 + 20x + 12 = 5x - x^2$

Directions: Solve the equation by using the quadratic formula. Write your answer in simplest radical form.

75. $5x^2 - 3x - 6 = 0$

76. $2x^2 - 14x + 40 = 3x^2 - 16x + 32$

Directions: Write the equation of the line in slope intercept form that follows the given conditions.

77. Contains the point $(-4, -2)$ and has a slope of $\frac{1}{2}$.

78. Passes through the points $(-3, 7)$ and $(5, -3)$.

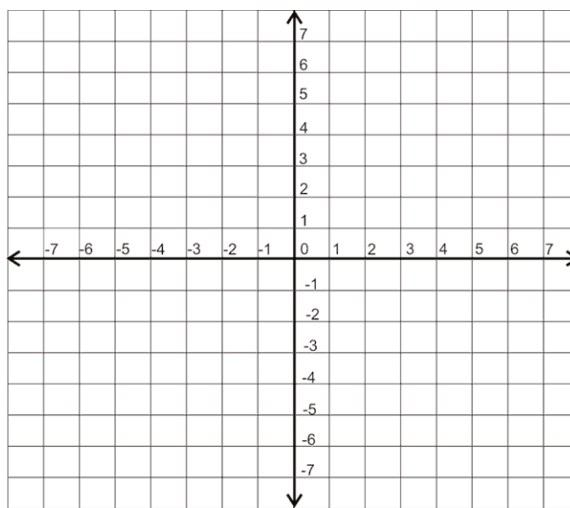
79. Find the equation of the line that is perpendicular to #78 and passes through the point $(4, 1)$.

80. Has an x – intercept of -3 and a y intercept of -1 .

Directions: Fill in the table of values and graph each parent function.

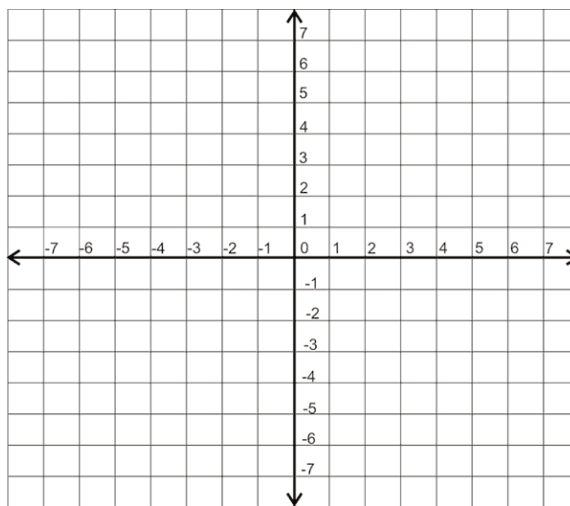
81. $y = x^2$

x	y
-2	
-1	
0	
1	
2	



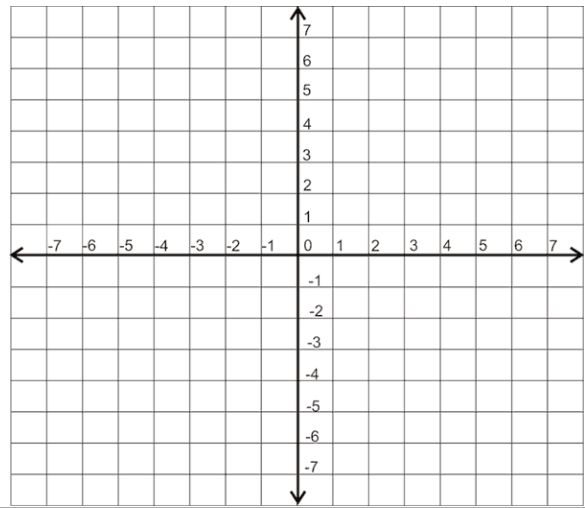
82. $y = \sqrt{x}$

x	y
0	
1	
4	
9	



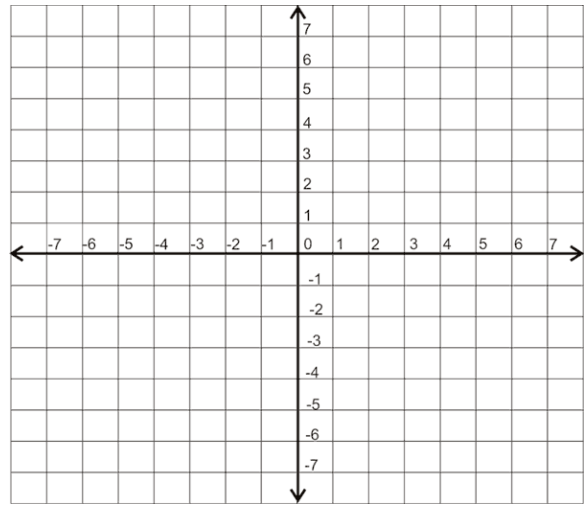
83. $y = |x|$

x	y
-2	
-1	
0	
1	
2	



84. $y = 2^x$

x	y
-2	
-1	
0	
1	
2	



Directions: Describe the transformation compared to the parent function.

85. $y = \sqrt{x - 2} + 5$

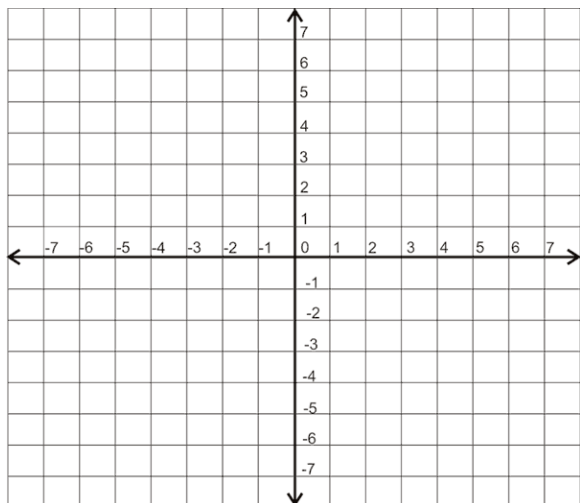
86. $y = -(x + 3)^2 - 4$

87. $y = 2(x - 1)^2$

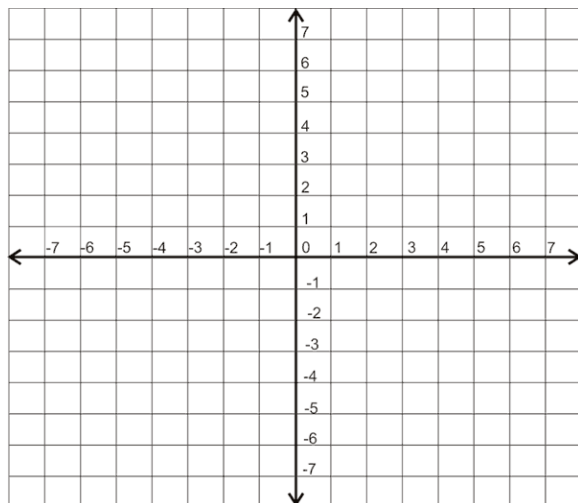
88. $y = \frac{1}{2}|x + 4| - 1$

Directions: Use each parent function to graph each transformed function. NO GRAPHING CALCULATOR OR APPLICATION SHOULD BE USED.

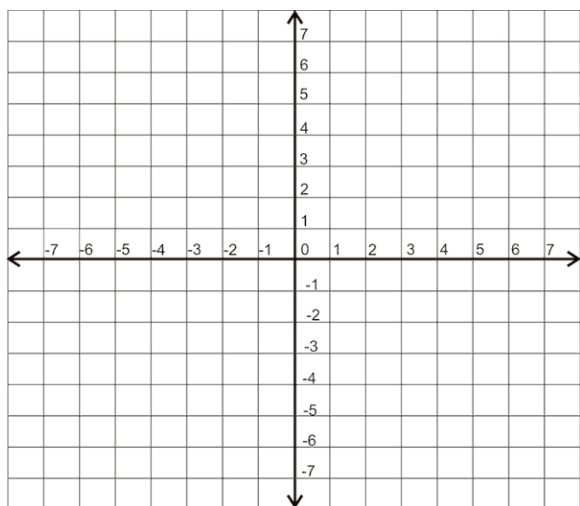
89. $y = \sqrt{x - 1} + 2$



90. $y = -(x + 2)^2 - 3$



91. $y = 2(x + 1)^2$



92. $y = -\frac{1}{2}x^2 + 3$

