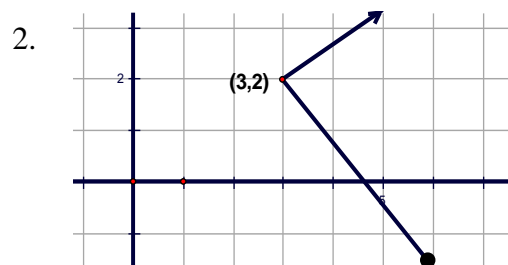
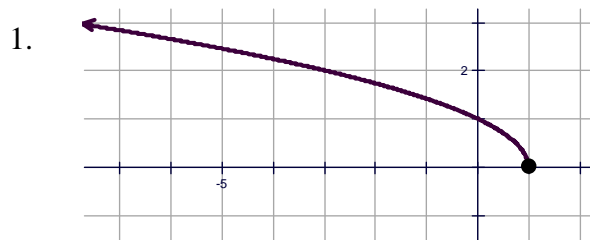


I. Use interval notation to give the domain and range for each of the following relations.



II. Is  $y$  a function of  $x$ ? Defend your answer with a mathematical reason or counter example.

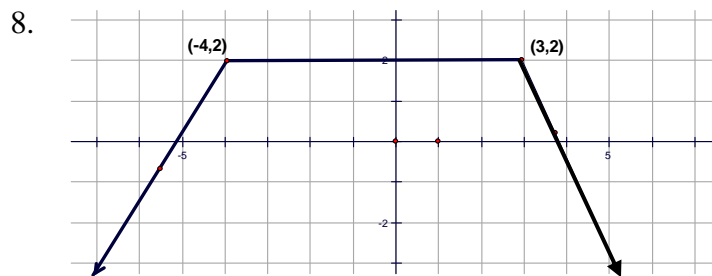
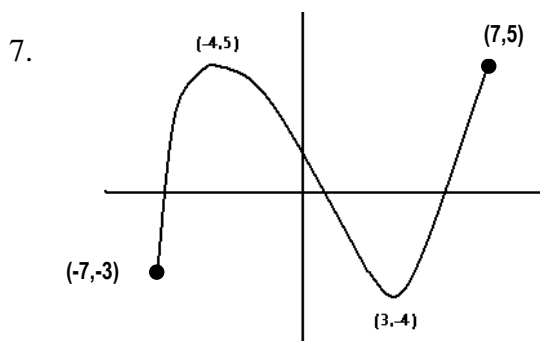
3.  $3y + 2x - 19 = 0$

4. #1 above

5. #2 above

6.  $2x^2 + y = 9$

III. Determine the interval(s) in each of the following functions for which the function is increasing, decreasing, or constant.



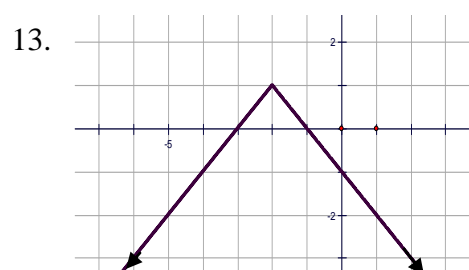
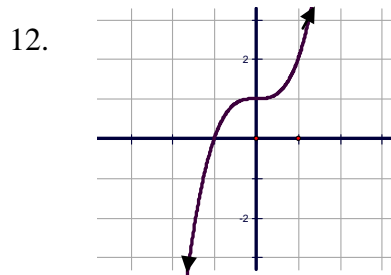
IV. Determine algebraically whether the given function is even, odd, or neither. Show all work!

9.  $f(x) = \frac{1}{3}x^4 - 5x^2 + 1$

10.  $f(t) = -3t^3 + 2t^2 + 4$

11.  $h(x) = 5x^5 - 3x$

V. Identify the parent function for each transformation shown. Write the equation for each graph.



VI. For each function, find the zeros *algebraically*. Write your answers as ordered pairs.

14.  $f(x) = 3x^2 + 13x + 10$

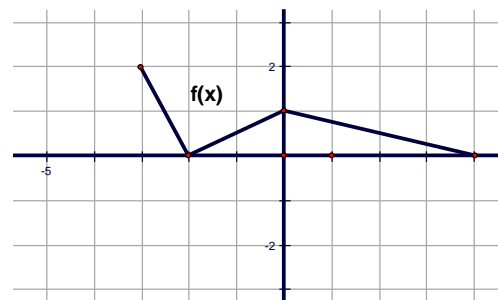
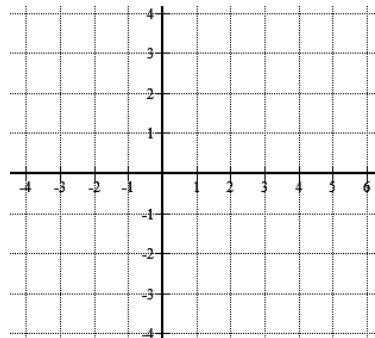
15.  $h(x) = 2x^3 + x^2 - 10x$

VII. Given that  $f(x) = x^2 + 1$ ,  $g(x) = x - 4$  and  $h(x) = -2x$ , evaluate the following. Simplify if necessary.

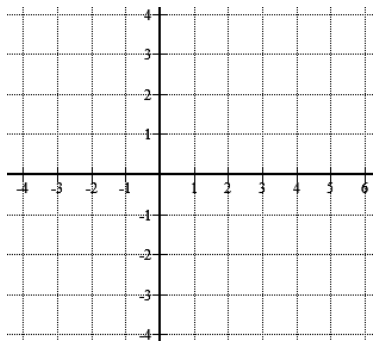
16.  $(f + g)(-2)$                               17.  $(f - g)(t - 1)$                               18.  $(h \cdot g)\left(-\frac{1}{4}\right)$
19.  $\left(\frac{f}{g}\right)(0)$                               20.  $(f \circ g)(x)$                               21.  $(g \circ f)(-4)$

VIII. Given the graph of  $f(x)$  at the right, sketch each of the following, labeling any significant points.

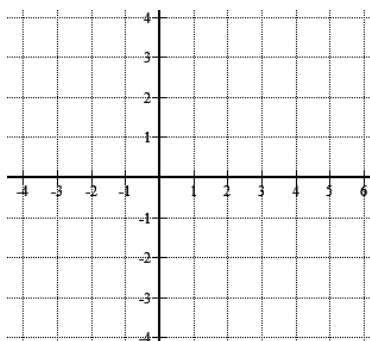
22.  $g(x) = f(x) + 2$



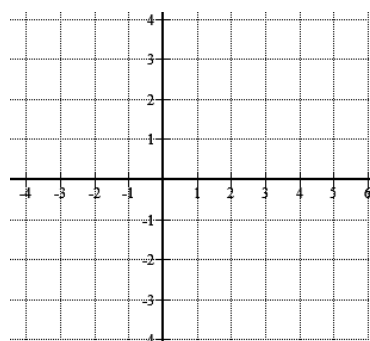
23.  $h(x) = f(x - 1)$



24.  $j(x) = -f(-x)$



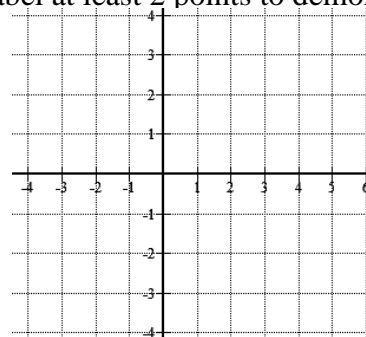
25.  $f(2x)$



IX. Show that  $f(x) = 3 - 4x$  and  $g(x) = \frac{3 - x}{4}$  are inverse functions:

26. **algebraically** using the definition

27. **graphically** (and label at least 2 points to demonstrate)



X. Determine whether or not each of the following functions has an inverse. If it does, find the inverse.

28.  $r(x) = \frac{1}{x^2}$

29.  $w(x) = \sqrt{2x + 3}$