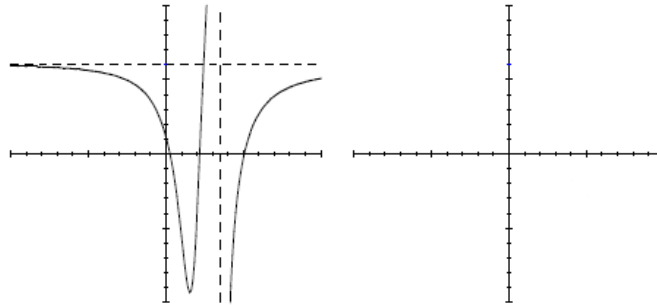




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- 1) Given the graph of $f(x)$. Draw the graph of $f(x)$ after it has been shifted left by 2 units, then reflected about the y -axis, and finally shifted up 3 units.



- 2) Let $f(x) = x^3$. If the graph of f is moved 2 units to the right, compressed vertically by a factor of 2, shifted 3 units down, and finally reflected across the x -axis, what is the y -intercept?
- 3) Given $f(x) = 3x^2 - 10x - 8$ and $g(x) = \frac{\sqrt{x}}{2}$, find $\frac{f(x)}{g(x)}$ and its domain.
- 4) Given $f(x) = -\frac{3}{8x}$ and $g(x) = \frac{9}{64-16x^2}$, find the composite function $(f \circ g)(x)$ and its domain.
- 5) What is the domain of the following function...

$$\sqrt{\frac{x}{x^2 - 2x - 35}}$$

- 6) What are the zero's of the following polynomial? What are the multiplicities of each zero. Finally, write the linear factors of the polynomial and graph the polynomial [Use synthetic division and the rational roots theorem].

$$x^6 - x^5 - 9x^4 + 13x^3 + 8x^2 - 12x$$

- 7) How is the graph of $g(x) = a(x - h)^2 + k$ related to the graph of $f(x) = x^2$ if the all the values of a , h , and k are all positive?
- 8) The function $f(x) = -2x^2 + 12x - 19$ is not one-to-one but can be made so by restricting its domain to a particular interval. If you are told the point $(-9,1)$ is on the graph of the inverse function find $f^{-1}(x)$ as well as the interval f was restricted to, to make it one-to-one.
- 9) Write the equation of parabola with vertex $(-3,2)$ and going through the point $(1,34)$.
- 10) What is the vertex of a parabola with intercepts $(-6,0)$, $(2,0)$, and $(0,3)$?
- 11) Give two functions who's composition would result in the function:

$$h(x) = \frac{5\sqrt[3]{2x-1}}{8 - \sqrt[3]{2x-1}}$$



- 12) Consider $f(x) = 5 + \frac{2x-3}{x+8}$ and $g(x) = \frac{37-8x}{x-7}$.
- Rewrite the functions as a polynomial plus a proper rational function [Hint: Use Long division].
 - Show the functions f and g are inverses.
- 13) Suppose the weekly Profit for Gator Gadgets, a popular local novelty store, depends on the number of novelty unit produced each week. Now, suppose that the Profit can be modeled by the function $P(x) = -3x^2 + 7x + 480$ where x is the number of novelties produced in thousands per week. How many novelties should Gator Gadgets produce in order to maximize profit?

- 14) Simplify the complex valued expressions...

a)

$$\frac{5}{i^3}$$

c)

$$-\frac{2i}{2+i} + \frac{i}{3-2i}$$

b)

$$(2 + 3i)^2$$

d)

$$\frac{(3 + \sqrt{-4})(4 - \sqrt{-9})}{\sqrt{-5}\sqrt{-20}}$$

- 15) Solve for x : $(x - (3 - 2i))(x - (3 + 2i)) = 5 - 6x$

- 16) Graph the following rational function. Include in your graph the x-intercepts, y-intercepts, the holes, the vertical asymptotes and the horizontal asymptotes.

$$g(x) = \frac{2x^3 - 5x^2 - 9x + 18}{x^3 - 2x^2 - 9x + 18}$$

- 17) Evaluate $f(3)$ if $f(x) = -6x^6 + 20x^5 - 3x^4 - 21x^2 - 20x - 2$.

- 18) If the polynomial $f(x)$ with only real coefficients has the following zeros (multiplicities shown in parenthesis), what is the smallest degree of $f(x)$?

$$x = 0 (3), \quad x = -2 + 3i (4), \quad x = 3 + 7i (1), \quad x = -2 (1)$$

- 19) Find the average rate of change for the function $f(x) = x^3 - 2x$ from 2 to x and simplify.

- 20) Perform Long Division on the rational function.

$$f(x) = \frac{-9x^3 - 2x + 24}{3x^2 - 2x + 5}$$

- 21) Solve the following inequalities; write the answers in interval notation.

a)

$$x(x-1)^2(x+2)^3(2x+1)^4 < 0$$

b)

$$x^3 - 9x - 2 \geq 2x^2 - 20$$

c)

$$\frac{3x}{x-1} \leq \frac{x}{x+4} + 3$$

- 22) Let $f(x)$ be an odd function with $(2,4)$ on its graph and let $g(x)$ be an even function with $(-2,5)$ on its graph.

a) Find $(f + g)(2)$

b) Find $\left(\frac{f}{g}\right)(-2)$

c) If $f(x)$ is one-to-one function. For what values of x does $f(-x) = f(x)$?