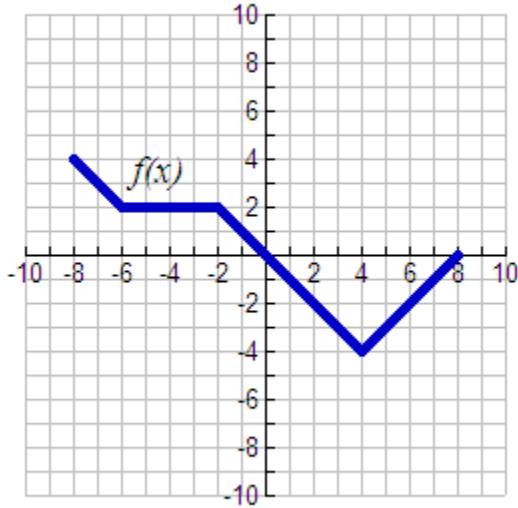


1. Use the graph of $y = f(x)$ to graph $y_1 = \frac{1}{2}f(x)$ and $y_2 = 2f(x)$ on the same coordinate plane.

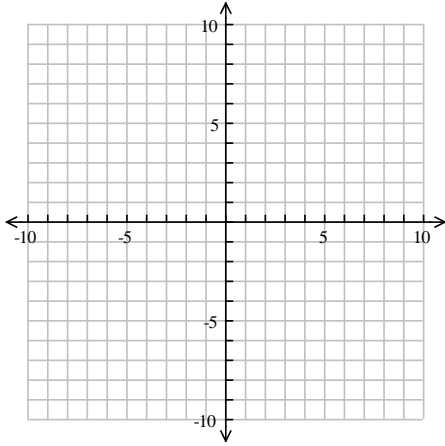


2. Algebraically show $f(x) = \frac{-4x}{2x^3 - 7x}$ is even, odd, or neither.

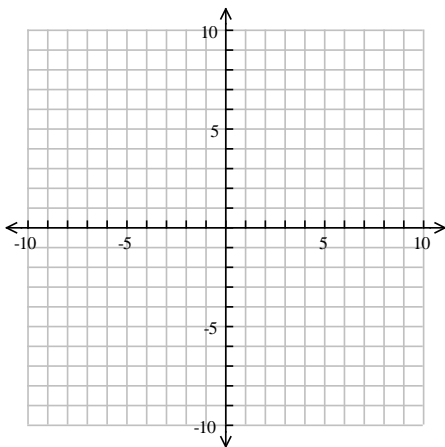
3. A water trough is constructed from a rectangular 5-meter by 8-meter sheet of stainless steel by cutting squares of equal size from each corner, folding up the sides, and welding the seams. What should the dimensions of the cutout squares be to have maximum volume? What is the maximum volume?

4. Graph $f(x) = \frac{x^2}{2} - 5x + \frac{33}{2}$ by writing f in standard form and then by transforming $y = x^2$.

Then identify the axis of symmetry.



5. Sketch a quadratic function y_1 whose leading coefficient is negative and whose discriminant is negative. Sketch a quadratic function y_2 whose leading coefficient is positive and whose discriminant is zero.



6. When a marble is thrown straight upwards at an initial speed of 80 meters per second on a distant planet, it will reach a height $h(t) = -8t^2 + 80t$ after t seconds.

a. When does the marble reach a height of 128 meters?

b. What is the maximum height reached?

c. When does the marble hit the ground?

7. Use a graphing calculator to find the local extrema, rounding each coordinate to the nearest hundredth, for the function $f(x) = x^4 + 2x^3 - 4x^2 + x - 5$.

8. Let $f(x) = \frac{1}{x^2 - 81}$, $g(x) = x + 9$, and $h(x) = x^2 - 7x - 18$.

a. Find $(h + g)(x)$ and its domain.

b. Find $(fg)(x)$ and its domain.

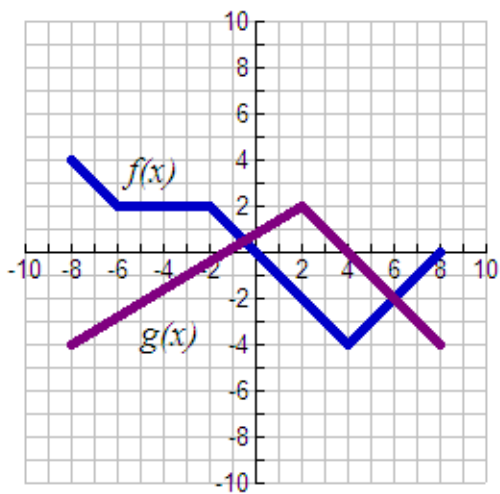
c. Find $\left(\frac{g}{h}\right)(x)$ and its domain.

d. Find $(g \circ g)(x)$ and its domain.

e. Find $(h \circ f)(x)$ and its domain.

9. Find functions f and g such that $h(x) = (f \circ g)(x) = \sqrt{x^2 + 9x}$.

10. Use the graph below to evaluate the following.



a. $(g \circ f)(-4) =$

b. $(f \circ g)(-8) =$

c. $(g - f)(3) =$

d. $(f \circ f \circ f)(4) =$

e. $(fg)(5) =$