

1. Using the graph of the function f to answer the following questions.

a) State the domain: $[-4, 6]$ or $\{x \mid -4 \leq x \leq 6\}$

b) State the range: $[-3, 3]$ or $\{y \mid -3 \leq y \leq 3\}$

c) List the y-intercept(s) $(0, 2)$ or 2

d) List the x-intercept(s) $(-3, 0)$ $(3, 0)$ $(5, 0)$

e) Find $f(-2)$ 3

f) For what values of x does $f(x) = 1$?

estimate \rightarrow $x = -2.67, 2, 6$

g) For what values of x is $f(x) \geq 0$?
Give your answer in interval notation.

$[-3, 3] \cup [5, 6]$

h) Over what interval(s) is f decreasing?

$(-2, 4)$

i) Over what interval(s) is f increasing?

$(-4, -2) \cup (4, 6)$

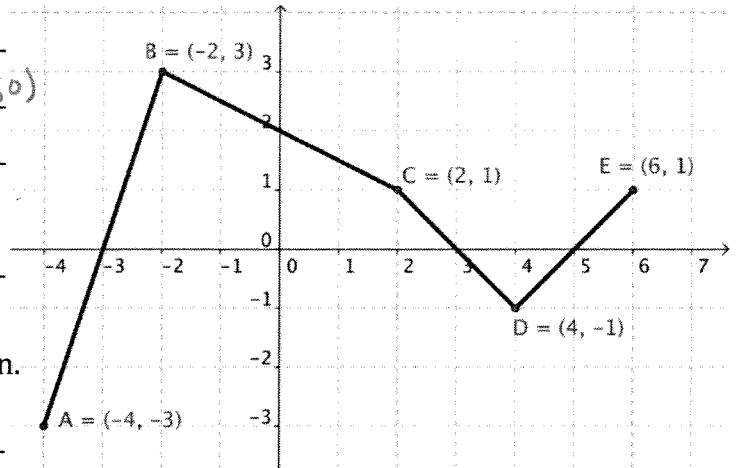
j) List the local maximum(s).

When $x = -2$, the local maximum is 3 .

k) List the local minimum(s).

When $x = 4$, the local minimum is -1 .

function f



2. List the transformations in order on how the graph of the function $f(x) = \sqrt[3]{x}$ can be transformed to the graph of $f(x) = -\frac{1}{4}\sqrt[3]{x+2} - 5$.

Be specific in direction of transformation!

- Reflection over the x-axis.
- Vertical shrink by $\frac{1}{4}$
- Horizontal shift LEFT 2.
- Vertical shift DOWN 5.

3. List the transformations in order on how the graph of the function $f(x) = |x|$ can be transformed to the graph of $f(x) = -2|x - 4| - 1$.

Be specific in direction of transformation!

- Reflection over the x-axis
- Vertical stretch by 2.
- Horizontal shift RIGHT 4.
- Vertical shift DOWN 1.

4. Evaluate the function for the given value of x.

$$f(x) = \begin{cases} x - 2 & \text{if } x < 4 \\ x + 2 & \text{if } 4 \leq x \leq 8 \\ 2x^2 & \text{if } x > 8 \end{cases}$$

$$(-1) - 2$$

$$(8) + 2$$

$$\begin{matrix} 2(12)^2 \\ 2(144) \end{matrix}$$

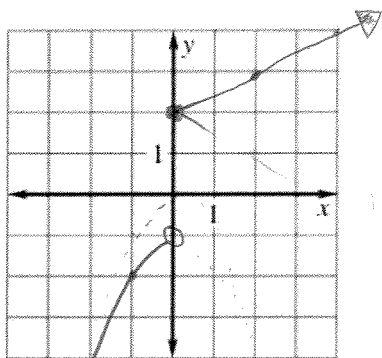
$$f(12) = \underline{288}$$

$$f(-1) = \underline{-3}$$

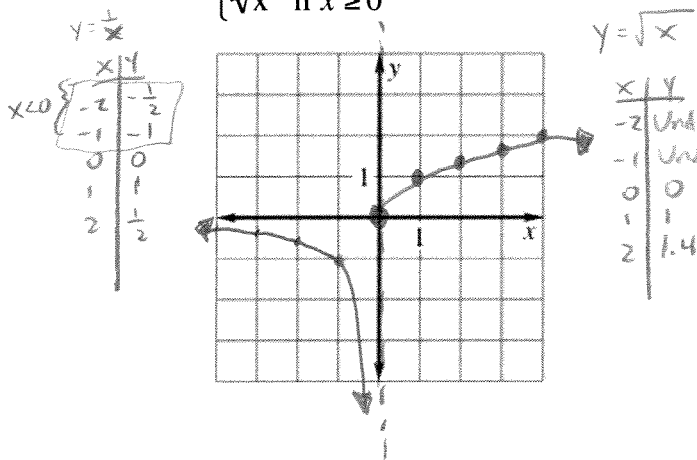
$$f(8) = \underline{10}$$

5. Graph the piecewise function.

a. $f(x) = \begin{cases} -x^2 - 1 & \text{if } x < 0 \\ \frac{1}{2}x + 2 & \text{if } x \geq 0 \end{cases}$

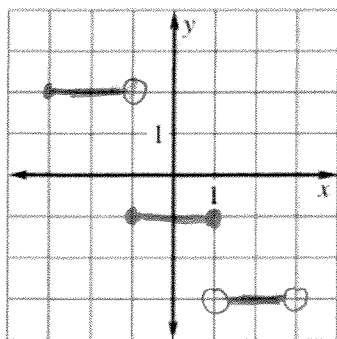


b. $f(x) = \begin{cases} \frac{1}{x} & \text{if } x < 0 \\ \sqrt{x} & \text{if } x \geq 0 \end{cases}$

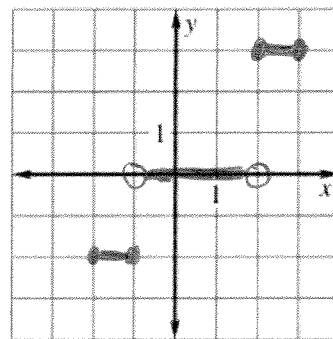


6. Graph the step function.

a. $f(x) = \begin{cases} 2 & \text{if } -3 \leq x < -1 \\ -1 & \text{if } -1 \leq x \leq 1 \\ -3 & \text{if } 1 < x < 3 \end{cases}$



b. $f(x) = \begin{cases} -2 & \text{if } -2 \leq x \leq -1 \\ 0 & \text{if } -1 < x < 2 \\ 3 & \text{if } 2 \leq x \leq 3 \end{cases}$



7. Use a graphing utility to graph each function over the indicated interval. Approximate any local maxima and local minima. Determine where the function is increasing and where it is decreasing.

$$f(x) = 2x^3 - 5x + 1 \quad (-3, 3)$$

a. Find the Local Max

When $x = -.91$, the local maximum is 4.04.

b. Find the Local Minimum

When $x = .91$, the local minimum is -2.04.

c. Find the interval(s) where f is increasing

$$(-3, -.91) \cup (.91, 3)$$

d. Find the interval(s) where f is decreasing

$$(-.91, .91)$$

8. Find the domain of the function.

a. $g(x) = \sqrt{12 - 4x}$
 $12 - 4x \geq 0$
 $\frac{-4x}{-4} \geq \frac{-12}{-4}$
 $x \leq 3$
 $\{x \mid x \leq 3\}$
 or
 $(-\infty, 3]$

b. $h(x) = \frac{\sqrt{x}}{|x|}$ — $x \geq 0$
 $x \neq 0$
 $\{x \mid x > 0\}$

9. Determine if the function $k(x) = x^3 - 4x$ is EVEN, ODD, or NEITHER. Show work.

$$k(-x) = (-x)^3 - 4(-x)$$

$$= -x^3 + 4x$$

or

$$-(x^3 - 4x)$$

So, $k(x) = -k(x)$ ODD

10. Describe the transformation of the graph at the right.

dashed — The solid line is the original graph.

- Reflection over x -axis.
- Horizontal shift left 3.
- Vertical shift down 2.

$$y = -|x + 3| - 2$$

