

PC-1 Review

1) Algebraically find the domain of the following functions.

a) $h(x) = \frac{3x}{x^2-16}$

$$x^2 - 16 = 0$$

$$\begin{array}{cc} +16 & +16 \\ \hline \sqrt{x^2} = \sqrt{16} \end{array}$$

$$x = 4 \quad x = -4$$

$D: \{x \mid x \neq 4, x \neq -4\}$

b) $f(x) = \frac{4}{x^2-5x}$

$$x^2 - 5x = 0$$

$$x \begin{array}{|c|} \hline x^2 \quad -5x \\ \hline x \quad -5 \end{array}$$

$$x(x-5) = 0$$

$$x = 0 \quad x = 5$$

$D: \{x \mid x \neq 0, x \neq 5\}$

c) $g(x) = \sqrt{9x+7}$

$$9x + 7 \geq 0$$

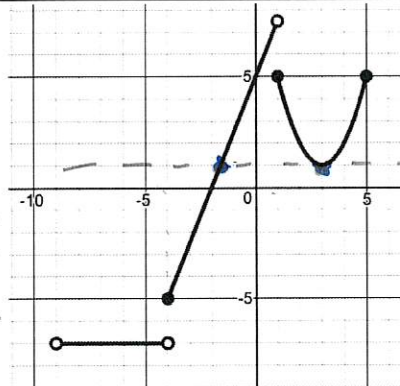
$$\begin{array}{cc} -7 & -7 \\ \hline 9x \geq -7 \\ \frac{9x}{9} \geq \frac{-7}{9} \end{array}$$

$$x \geq -7/9$$

$D: \{x \mid x \geq -7/9\}$

2) a) Write the definition of the piecewise function $g(x)$ shown.

$$g(x) = \begin{cases} -7, & -9 < x < -4 \\ \frac{5}{2}x + 5, & -4 \leq x < 1 \\ (x-3)^2 + 1, & 1 \leq x \leq 5 \end{cases}$$



3) Use the graph of $g(x)$ to evaluate the following:

d) Evaluate $g(0) = 5$

e) Evaluate $g(-4) = -5$

f) Solve $g(x) = 1$. Write as a set.

b) State the interval(s) over which g is increasing/decreasing.

Increasing: $(-4, 1) \cup (3, 5)$

Decreasing: $(1, 3)$

c) Find the domain and range.

$D: \{x \mid -9 < x \leq 5\}$ $R: \{y \mid y = -7, -5 \leq y < 7.5\}$ $X = \{-1.6, 3\}$

Determine if the function is even, odd, or neither.

4) $G(x) = \frac{3x}{x+x^3}$

I created a bad example!

Technically, this would be even... We can chat about why next class.

Determine if the function is even, odd, or neither.

5) $f(x) = x^3 - 4x^8$

check: $f(-x) = (-x)^3 - 4(-x)^8$
 $= -x^3 - 4x^8$
 (Not even)

$-f(x) = -(x^3 - 4x^8)$
 $= -x^3 + 4x^8$

Neither

Use the graph to the right to answer the following:

6) Identify the local **extrema**. Indicate if it is a maximum or minimum.

Max: (3, 0)

Min: (-1.294, -260.896) AND (5.794, -82.792)

7) Identify intervals for which the graph is increasing/decreasing.

Increasing: $(-1.294, 3) \cup (5.794, \infty)$

Decreasing: $(-\infty, -1.294) \cup (3, 5.794)$

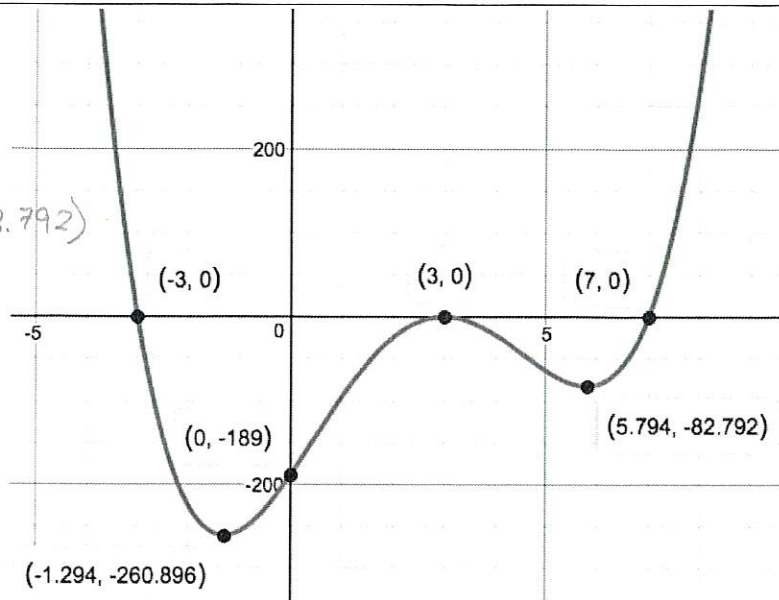
8) Identify intervals for which the graph is concave up/down.

Concave Up: $(-\infty, 0.853) \cup (4.397, \infty)$

Concave Down: $(0.853, 4.397)$

9) Identify the domain and range.

D: All reals R: $\{y \mid y \geq -260.896\}$

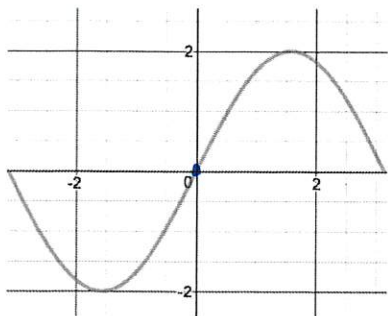


10) Identify the absolute MAX/MIN

MAX: N/A

Min: (-1.294, -260.896)

11) Determine if the function is even, odd, or neither. Explain your answer.



It is odd since it is symmetric around the origin

12) Let $f(x) = 3x^3 + 2x^2$

Evaluate $f(-2)$

$$f(-2) = 3(-2)^3 + 2(-2)^2$$

$$f(-2) = 3(-8) + 2(4)$$

$$f(-2) = -24 + 8$$

$$f(-2) = -16$$

13) Let $f(x) = 3x^3 + 2x^2$

Solve $f(x) = 0$

$$3x^3 + 2x^2 = 0$$

$$x^2 \begin{array}{|l} 3x^3 \\ 2x^2 \end{array}$$

$$x^2(3x + 2) = 0$$

$$x^2 = 0$$

$$3x + 2 = 0$$

$$-2 \quad -2$$

$$\frac{-2}{3}x = \frac{-2}{3}$$

$$x = \frac{-2}{3}$$

$$x = 0$$

$$x = \frac{-2}{3}$$

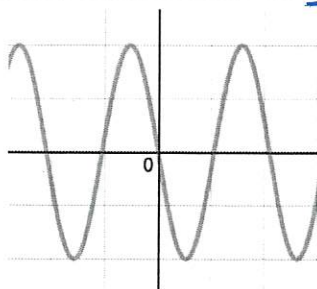
Determine if the following relations are well-defined functions. Explain why or why not.

14.

$\{(2, 5), (4, 7), (3, 4), (3, 4)\}$

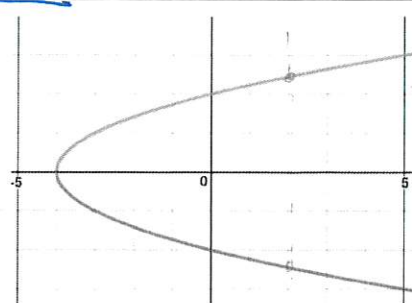
Yes because each input has only one output

15.



Yes, it passes the vertical line test

16.



No, it fails the vertical line test.