

Unit 1 Halfway Review

Name: Key

1. Write the equation of a line in standard form that goes through the points $(6, -5)$ and $(-2, 7)$

Point-slope

$$\begin{aligned} \rightarrow y - 7 &= -\frac{3}{2}(x + 2) \\ y - 7 &= -\frac{3}{2}x - 3 \end{aligned}$$

Slope-int $\rightarrow y = -\frac{3}{2}x + 4$

$$\frac{3}{2}x + y = 4$$

$$\boxed{3x + 2y = 8}$$

$$\frac{+12}{-8}$$

$$m = \frac{-12}{8}$$

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

2. Graph the piecewise function and complete the following.

$$f(x) = \begin{cases} 3 + x & \text{if } -3 \leq x < 0 \\ 7 & \text{if } x = 0 \\ x^{\frac{1}{3}} & \text{if } x > 0 \end{cases}$$

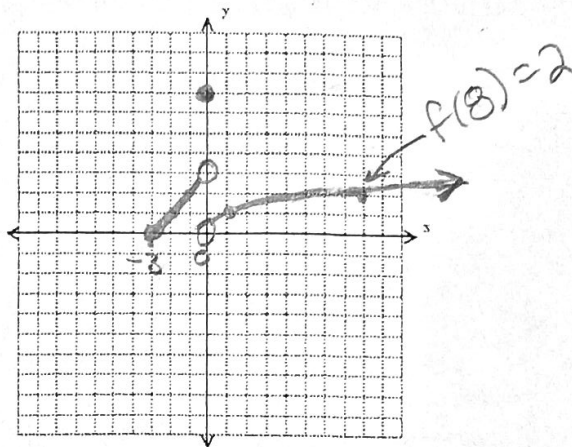
\rightarrow same as $\sqrt[3]{x}$

Domain: $[-3, \infty)$

Range: $[0, \infty)$

Find $f(8)$:

$$= 8^{\frac{1}{3}} = 2$$



3. A gym offers a variety of exercise classes. Members of the gym can attend up to 5 classes per week with their monthly fee of \$35. If they would like to attend more than 5 classes per week, they must pay an additional \$3 per class. The gym does not allow members to take more than 10 classes per week. Write the piecewise function that could be used to determine the cost a member would pay to go to the number of classes they'd like to attend.

$$f(x) = \begin{cases} 35, & 0 \leq x \leq 5 \\ 35 + 3[x - 5], & 5 < x \leq 10 \end{cases}$$

$x = \#$ classes per week

Identify the parent graph and the transformations.

4. $f(x) = -2\sqrt[3]{-x+5}$

$$f(x) = -2\sqrt[3]{-(x-5)}$$

- vertical stretch by 2
- reflect over x & y -axis
- shift right 5

5. $g(x) = |6x| + 7$

- horizontal compression by a factor of $\frac{1}{6}$
- translate up 7

6. Write the equation of a quadratic that has been reflected over the y -axis, vertically compressed by $\frac{1}{2}$, shifted left 3, and down 6.

$$y = \frac{1}{2}(-(x+3))^2 - 6$$

or

$$y = \frac{1}{2}(-x-3)^2 - 6$$

7. Is the function $f(x) = \sqrt[3]{x} + x^2 - x$ even, odd, or neither? Explain how you know.

$$f(-x) = \sqrt[3]{-x} + (-x)^2 - (-x)$$

$$= -\sqrt[3]{x} + x^2 + x$$

$$-f(x) = -\sqrt[3]{x} - x^2 + x$$

$$f(x) \neq -f(x) \neq f(x)$$

\therefore Neither

8. Determine the symmetry of the function $g(x) = \frac{x}{x^2+1}$

$$g(-x) = \frac{-x}{(-x)^2+1}$$

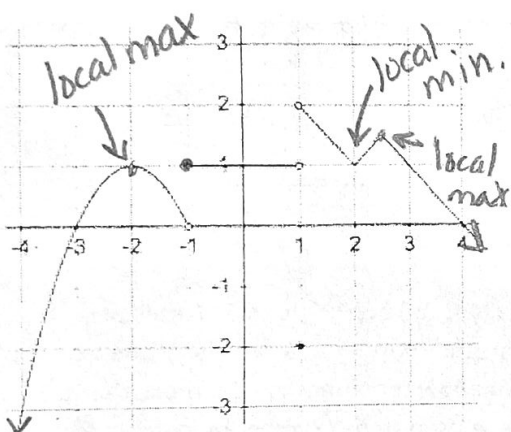
$$= -\frac{x}{x^2+1}$$

$$-g(x) = \frac{-x}{x^2+1}$$

$$g(-x) = -g(x)$$

\therefore odd

9. Using the graph below, find the following:



Domain: $(-\infty, 1) \cup (1, \infty)$

Range: $(-\infty, 2)$

Increasing: $(-\infty, -2) \cup (2, 2.5)$

Decreasing: $(-2, -1) \cup (1, 2) \cup (2.5, \infty)$

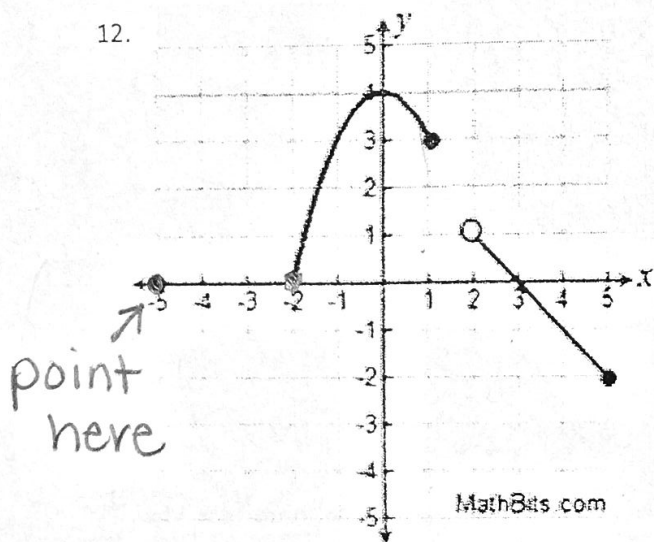
Max: relative max: 1, 1.5; no abs. max

Min: relative min: 1

no absolute minimum

Find the domain for each of the following.

12.



D: $(-5, -5) \cup (-2, 1) \cup (2, 5)$

R: $[-2, 4]$

13. $f(x) = \frac{\sqrt{5x-4}}{x+3}$

$$5x - 4 \geq 0$$

$$x + 3 \neq 0$$

$$x \geq \frac{4}{5}$$

$$x \neq -3$$



D: $[\frac{4}{5}, \infty)$