

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)

$$m = \frac{7 - (-5)}{-2 - 6} = \frac{12}{-8} = -\frac{3}{2}$$

$$y = -\frac{3}{2}x + b$$

$$-5 = -\frac{3}{2}(6) + b$$

$$-5 = -9 + b$$

$$4 = b$$

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

$$\angle \left(\frac{3}{2}x + y = 4 \right)$$

$$3x + 2y = 8$$

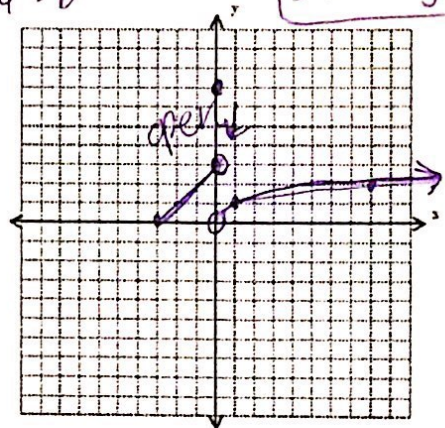
2. Graph the piecewise function and complete the following.

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

Domain: $[-3, \infty)$

Range: $[0, \infty)$

Find $f(8)$:
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.

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

$x = \# \text{ classes}$

Identify the parent graph and the transformations.

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

$f(x) = \sqrt[3]{x}$ → cubic - Right 5

- Reflect x-axis
- V. stretch by 2
- Reflect y-axis

Factor

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

$g(x) = \text{Abs. Value}$

- H. Compression by $\frac{1}{6}$
- up 7

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

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

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

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

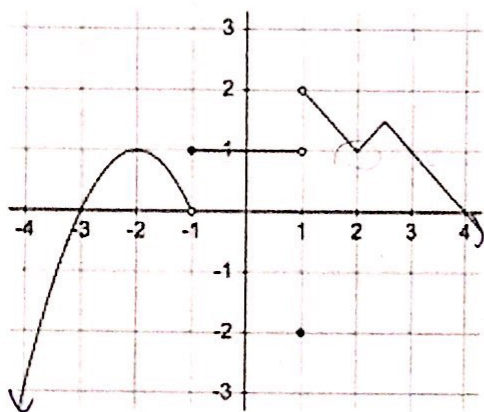
$$= -\sqrt[3]{x} + x^2 + x$$

Neither

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

x -axis $-y = \frac{x}{x^2+1}$ NO	y -axis $y = \frac{-x}{(-x)^2+1} \rightarrow \frac{-x}{x^2+1}$ NO	origin $-y = \frac{-x}{(-x)^2+1}$ $-y = \frac{-x}{x^2+1}$ yes!
---	---	---

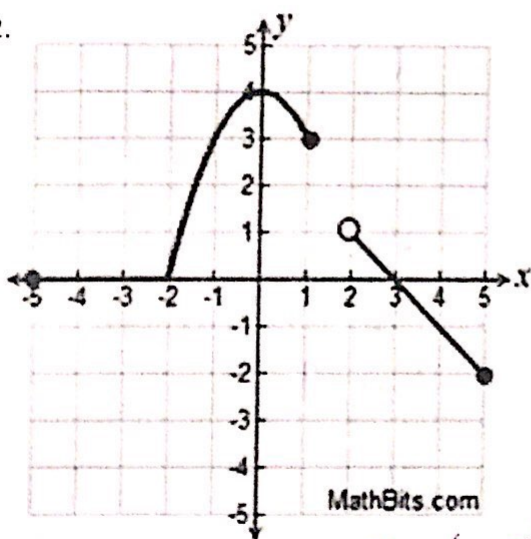
9. Using the graph below, find the following:



Domain: $(-\infty, \infty)$
 Range: $(-\infty, 2)$
 Increasing: $(-\infty, -2) \cup (2, 2.5)$
 Decreasing: $(-2, -1) \cup (1, 2) \cup (2.5, \infty)$
 Max: Rel \bullet @ $x = -2$ & 1.5 @ $x = 2.5$
 Min: Rel 1 @ $x = 2$

Find the domain for each of the following.

12.



$D: [-5] \cup [-2, 1] \cup (2, 5]$

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

$x \neq -3$

$5x - 4 \geq 0$

$5x \geq 4$

$x \geq 4/5$

$[4/5, \infty)$