

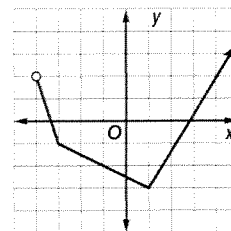
Name: Mine Date: _____ Period: _____

PreCalculus: Chapter 1 Review

1. State the domain and range of the function shown.

Domain: $(-4, \infty)$

Range: $[-3, \infty)$



2. Given $f(x) = 2x^2 - x$, find $f(x+h)$.

$$f(x+h) = 2(x+h)^2 - (x+h) \\ = 2(x^2 + 2xh + h^2) - x - h = 2x^2 + 2xh + 2h^2 - x - h$$

3. Find the zero of $f(x) = 4x + \frac{2}{3}$.

$$0 = 4x + \frac{2}{3} \rightarrow \frac{1}{4} \cdot \frac{2}{3} = 4x \cdot \frac{1}{4} \quad \underline{-\frac{1}{6} = x}$$

4. Find $f(-7)$ for $f(x) = \begin{cases} -|2x-1| & \text{if } x < -3 \\ x^3 & \text{if } x \geq -3 \end{cases}$ $\leftarrow -7 < -3 \rightarrow -|2(-7)-1| = -|-15| = \underline{-15}$

5. Determine whether the graph of $x = 5y^2 - 2$ is symmetric with respect to the x -axis, the y -axis, or the origin.



x-axis

6. Determine whether the function $f(x) = \frac{x}{x^2-4}$ is even, odd, or neither.



odd

7. Determine whether $f(x) = \frac{x^2+9}{x^2+3}$ is continuous at $x = -3$. If discontinuous, identify the type of discontinuity as infinite, jump, or removable.



continuous!

8. Describe the end behavior of $g(x) = -3x^4 - 2x$.

LE $\swarrow$ RE
decreasing $g(x) \rightarrow -\infty$ decreasing $g(x) \rightarrow -\infty$

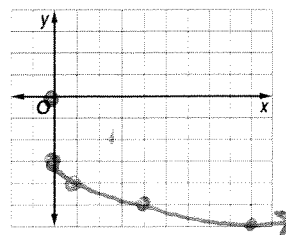
9. **FIREWORKS** The height in feet of a firework t seconds after it is launched is modeled by $h(t) = -16t^2 + 105t + 10$. Find its average speed from 1 to 3 seconds.

$$\text{Avg M} = \frac{f(3) - f(1)}{3 - 1} = \frac{181 - 99}{2} = \frac{82}{2} = 41 \text{ ft/sec}$$

10. Given $f(x) = -3\lfloor x - 2.5 \rfloor$, what is $f(-10.75)$? $\begin{aligned} &= -3\lfloor -10.75 - 2.5 \rfloor \\ &= -3\lfloor -13.25 \rfloor \\ &= -3(-14) = 42 \end{aligned}$

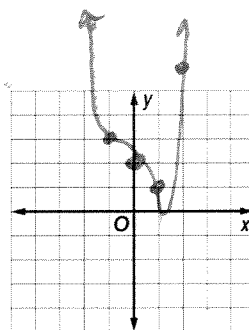
11. Use transformations of the parent graph of $m(x) = \sqrt{x}$ to sketch the graph of $p(x) = -\sqrt{x} - 3$.

Flip $\sqrt{x}$ $\downarrow 3$



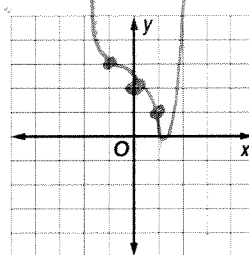
12. Describe the transformations relating the graph of $g(x) = \frac{1}{2}(x - 3)^2$ to the graph of its parent function $f(x) = x^2$.

wider $\times 2$ $\uparrow$ H. shift Right 3



13. Graph $f(x) = |x^3 - 2|$.

x	y
0	2
1	1
-1	3
2	6
-2	10



14. If $f(x) = x - 3$ and $g(x) = \frac{1}{x^2 - 9}$, a. find $(f \circ g)(x)$ and its domain. b. find $\left(\frac{f}{g}\right)(x)$ and its domain.

$$(f \circ g)(x) = \frac{x-3}{x^2-9} = \frac{x-3}{x+3(x-3)} = \frac{x}{x+3}$$

$$D: x \neq 3, -3$$

$$\frac{f}{g}(x) = \frac{x-3}{\frac{1}{x^2-9}} = (x-3) \cdot (x^2-9) = x^3 - 3x^2 - 9x + 27$$

$$D: \mathbb{R}$$

15. If $f(x) = x - 3$ and $g(x) = \frac{1}{x^2 - 9}$, a. find $[f \circ g](x)$.

$$f(g(x)) = \left(\frac{1}{x^2-9}\right) - 3$$

b. find $[g \circ f](x)$.

$$g(f(x)) = \frac{1}{(x-3)^2-9} = \frac{1}{x^2-6x} = \frac{1}{x(x-6)}$$

16. Find the inverse of:

a. $f(x) = x^3 - 4$

b. $g(x) = \sqrt{2x + 5}$

$$\begin{aligned} y &= x^3 - 4 \\ x &= y^3 - 4 \\ x + 4 &= y^3 \\ \sqrt[3]{x+4} &= y = f^{-1}(x) \end{aligned}$$

$$\begin{aligned} y &= \sqrt{2x+5} \\ x &= \sqrt{2y+5} \\ x^2 &= 2y+5 \\ x^2-5 &= 2y \\ \frac{x^2-5}{2} &= y = g^{-1}(x) \end{aligned}$$

17. Use composite functions to determine if $f(x) = x^2 + 4$ and $g(x) = \sqrt{x} - 4$ are inverse functions.

$$f(g(x)) = (\sqrt{x}-4)^2 + 4$$

$$= x - 8\sqrt{x} + 16 + 4$$

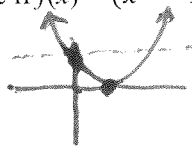
$$= x - 8\sqrt{x} + 20 \neq x$$

either $\leftarrow$

$$g(f(x)) = \sqrt{x^2+4} - 4 \neq x$$

Not inverses

18. Determine if $f(x) = (x - 1)^2$ is a one-to-one function. Explain why or why not.



fails
H-line
test
not
one-to-one

X	Y
2	1
0	1

$y = 1$ has 2 x's

19. **FINANCES** Nina saves 15% of every paycheck plus \$40. Write the function that can be used to find the amount of her paycheck given the amount she saves.

$$f(x) = 0.15x + 40$$

$$y = 0.15x + 40$$

$$x = 0.15y + 40$$

$$\frac{x - 40}{.15} = \frac{0.15y}{.15}$$

$$\frac{x - 40}{.15} = y$$

20. Determine the value of k such that $f(x) = \begin{cases} 2x^2 & \text{if } x < 2 \\ x + k & \text{if } x \geq 2 \end{cases}$ is continuous when $x = 2$.

$$2(2)^2 \rightarrow 8 \leftarrow (2) + k$$

$$(2) + k = 8$$

$$k = 6$$

