

**Pre Calculus 1-5 to 1-7 Review WS**

1. Identify the parent function  $f(x)$  of  $g(x)$ , and describe how the graphs of  $g(x)$  and  $f(x)$  are related. Then graph  $f(x)$  and  $g(x)$  on the same axes.

a.  $g(x) = 0.5|x + 4|$

b.  $g(x) = 2x^2 - 4$

2. Graph  $f(x) = \begin{cases} -1 & \text{if } x \leq -3 \\ 1 + x & \text{if } -2 < x \leq 2 \\ \lfloor x \rfloor & \text{if } 4 \leq x \leq 6 \end{cases}$

3. Use the graph of  $f(x) = x^3$  to graph  $g(x) = |(x + 1)^3|$ .

4. Show algebraically that  $f$  and  $g$  are inverse functions.

a.  $f(x) = 2x + 3; g(x) = \frac{x-3}{2}$

b.  $f(x) = \frac{x^2}{2} - 6; x \geq 0; g(x) = \sqrt{2x + 12}$

5. Find  $(f + g)(x)$ ,  $(f - g)(x)$ ,  $(f \cdot g)(x)$ , and  $\left(\frac{f}{g}\right)(x)$  for each  $f(x)$  and  $g(x)$ . State the domain of each new function.

a.  $f(x) = 2x^2 + 8$  and  $g(x) = 5x - 6$

b.  $f(x) = x^3$  and  $g(x) = \sqrt{x + 1}$

6. For each pair of functions, find  $[f \circ g](x)$ ,  $[g \circ f](x)$ , and  $[f \circ g](3)$ .

a.  $f(x) = 2x^2 - 5x + 1$  and  $g(x) = 2x - 3$

b.  $f(x) = 2x^3 - 3x^2 + 1$  and  $g(x) = 3x$

7. Graph each function using a graphing calculator, and apply the horizontal line test to determine whether its inverse function exists. Write *yes* or *no*.

a.  $f(x) = -\sqrt{x + 3} - 1$

b.  $f(x) = x^5 + 5x^3$

8. Determine whether  $f$  has an inverse function. If it does, find the inverse function and state any restrictions on its domain.

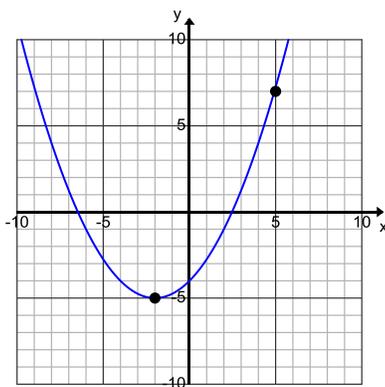
a.  $f(x) = \sqrt[3]{x - 1}$

b.  $f(x) = \frac{2x - 1}{x + 7}$

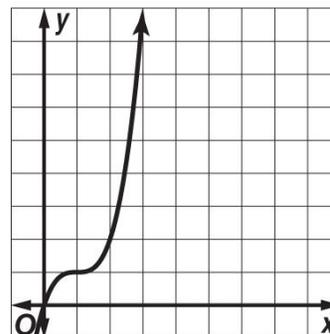
c.  $f(x) = \frac{4}{(x - 3)^2}$

d.  $f(x) = \sqrt{x - 2}$

9. For the graph below list the parent function, all of the transformations, and find the equation.



10. Use the graph of  $f(x)$  to graph  $f^{-1}(x)$ .



11. **FIRE FIGHTING** Airplanes are often used to drop water on forest fires in an effort to stop the spread of the fire. The time in seconds it takes for the water to travel from the plane to the ground is given by the function  $t(h) = \frac{\sqrt{h}}{4}$ , where  $h$  is given in feet. Find the inverse of the function. If the water takes 8 seconds to hit the ground, from what height did the plane drop the water?