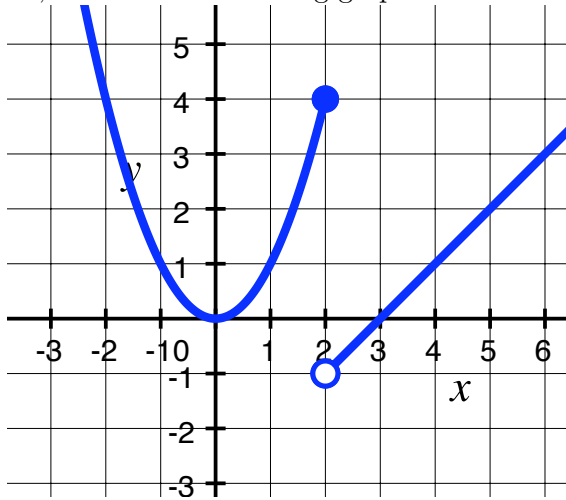


## Math 111 Quiz #3 Answers

1. For  $x \leq 2$ , we have the graph of  $y = x^2$ , which is a parabola that opens upward and goes through the points  $(0,0)$ ,  $(1,1)$ ,  $(2,4)$ ,  $(-1,1)$ , and  $(-2,4)$ . There will be a closed circle at  $(2,4)$ , since this portion includes  $x = 2$ .

For  $x > 2$ , we have the graph of  $y = -3 + x$ , which is a line of slope 1 that goes through the points  $(2,-1)$ ,  $(3,0)$ , etc.

So, we have the following graph.



2. (a) Since  $g(5) = \sqrt{5-1} = 2$ , we have that  $g(g(5)) = g(2) = \sqrt{2-1} = \boxed{1}$
- (b)  $f(g(x)) = f(\sqrt{x-1}) = 3(\sqrt{x-1})^2 + 7 = 3(x-1) + 7 = \boxed{3x+4}$
- (c) Solving for  $y$  in the equation  $y = \sqrt{x-1}$ :  $y^2 = x-1 \Rightarrow y^2 + 1 = x$   
 So,  $\boxed{x = g^{-1}(y) = y^2 + 1}$
3.  $x$ -intercepts can be found by setting  $y = 0$ , since  $x$ -intercepts are points with a  $y$ -coordinate of 0.
- $$0 = 2x^2 + 2x - 24$$
- $$0 = 2(x^2 + x - 12)$$
- $$0 = 2(x+4)(x-3) \Rightarrow x = -4, \quad x = 3$$

So, the  $x$ -intercepts are  $\boxed{(-4, 0) \text{ and } (3, 0)}$ .