

Quiz 8, 4 November 2008

1. (2 points) Let  $f(x) = \sqrt{4-x}$  and  $g(x) = x+5$ . Find the domain of the function  $\left(\frac{f}{g}\right)$  and express the domain as a union of intervals.

*Solution:* The domain is  $(-\infty, -5) \cup (-5, 4]$ .

2. (2 points) If  $f(x) = 3x - 12$ , find  $f^{-1}(x)$ .

*Solution:* We solve  $y = 3x - 12$  for to express  $x$  in terms of  $y$ . Thus,  $y + 12 = 3x$  and then  $x = y/3 + 12/3 = y/3 + 4$ . Hence  $g^{-1}(y) = y/3 + 4$  or  $g^{-1}(x) = x/3 + 4$ .

3. (1 point per part) If  $f(1) = 2$ ,  $f(2) = 3$  and  $f(3) = 1$  and  $f$  is one to one, find the following:

a)  $f(f(1))$       b)  $f^{-1}(2)$       c)  $f^{-1}(f(2))$

*Solution:* a)  $f(f(1)) = f(2) = 3$ . b)  $f(1) = 2$ , so  $f^{-1}(2) = 1$ . c)  $f(f^{-1}(2)) = 2$  by the cancellation property of a function and its inverse.