Quiz 7

1 Given

find the the domain of $f \circ g$. (Show at least how you calculate every constant number that appears in your answer.)

 $g(x) = \frac{2}{x},$

First, dom $g = \{x \mid x \neq 0\}$, since we're dividing by x in g(x). Next, since we're dividing by x - 1 in f(x), we're dividing by g(x) - 1 in $(f \circ g)(x)$:

$$\frac{2}{x} - 1 \neq 0;$$

$$\frac{2 - x \neq 0;}{-x \neq -2;}$$

$$x \neq 2.$$

Therefore,

$$\operatorname{dom}(f \circ g) = \{ x \mid x \neq 0, \ x \neq 2 \}.$$

2 Given

$$f(x) = 4x + 2,$$

find a formula for the inverse of f. Show at least what equation you solve to find this, as well as your final answer.

I set f(x) = y and solve for x to find $f^{-1}(y)$:

$$f(x) = y;$$

$$4x + 2 = y;$$

$$4x = y - 2;$$

$$x = \frac{1}{4}y - \frac{1}{2};$$

$$f^{-1}(y) = \frac{1}{4}y - \frac{1}{2}.$$

3 Suppose that f is a one-to-one function, the domain of f is $[5,\infty)$, and the range of f is $[-2,\infty)$. State the domain and range of f^{-1} (indicating which is which).

Simply swap them:

dom
$$f^{-1} = [-2, \infty),$$

ran $f^{-1} = [5, \infty).$

$$f(x) = \frac{3}{x-1},$$

g by x in
$$g(x)$$
. N
$$g(x) - 1 \neq 0;$$
$$\frac{2}{2} - 1 \neq 0;$$