

Name: Solution

MAC1105 Section 1A26

Quiz 10

Please show all of your work in a NEAT and ORGANIZED fashion.

1. (3 points) Determine whether the functions $f(x) = \frac{1}{7}x + 28$ and $g(x) = 7x - 28$ are inverses.

$$\begin{aligned}f(g(x)) &= f(7x - 28) \\&= \frac{1}{7}(7x - 28) + 28 \\&= x - 4 + 28 \\&= x + 24 \\&\neq x\end{aligned}$$

OR

$$\begin{aligned}g(f(x)) &= g\left(\frac{1}{7}x + 28\right) \\&= 7\left(\frac{1}{7}x + 28\right) - 28 \\&= x + 196 - 28 \\&= x + 168 \\&\neq x\end{aligned}$$

f and g are not inverses.

2. (4 points) Let $f(x) = \frac{2x+1}{3}$. State whether f is a one-to-one function. If f is one-to-one, write the equation for the inverse function $f^{-1}(x)$.

f is one-to-one, so it has an inverse.

$$y = \frac{2x+1}{3} \xrightarrow{\text{switch } x \text{ and } y} x = \frac{2y+1}{3}$$

$$3x = 2y + 1$$

$$3x - 1 = 2y$$

$$y = \frac{3x-1}{2} \rightarrow$$

$$\boxed{f^{-1}(x) = \frac{3x-1}{2}}$$

3. (3 points) Solve the equation.

$$2^{x+1} = 8^{3-x}$$

$$2^{x+1} = (2^3)^{3-x}$$

$$2^{x+1} = 2^{3(3-x)}$$

$$x+1 = 9-3x$$

$$4x = 8$$

$$x = 2$$