

Math 2513
Assignment 5

1. Suppose $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = 3x + 2$, and $g : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $g(x) = x^2$. Answer the following questions. If it's a yes-or-no question, justify your answer.

- a. Is f one-to-one?
- b. Is f onto?
- c. Is f a bijection?
- d. If f is a bijection, find a formula for f^{-1} .
- e. Is g one-to-one?
- f. Is g onto?
- g. Is g a bijection?
- h. If g is a bijection, find a formula for g^{-1} .
- i. Find a formula for $f \circ g$.
- j. Find a formula for $g \circ f$.

2. Suppose $g : [0, \infty) \rightarrow [0, \infty)$ is defined by $g(x) = x^2$. Answer the following questions, justifying your answer.

- a. Is g one-to-one?
- b. Is g onto?
- c. Is g a bijection?
- d. If g is a bijection, find a formula for g^{-1} .

3. Let $S = \{1, 2, 3, 4, 5, 6\}$. The functions $f : S \rightarrow S$ and $g : S \rightarrow S$ are given by the following diagrams. Draw diagrams for

- a. $f \circ g$
- b. $g \circ f$
- c. f^{-1}
- d. g^{-1}

