

Math 1232: Single-Variable Calculus 2  
George Washington University Spring 2023  
Recitation 1

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**Problem 1.** (a) Is the function  $f(x) = |x|$  one-to-one? Prove it is, or find a counterexample.

(b) Is the function  $g(x) = 5x^3 + 3$  one-to-one? Prove it is, or find a counterexample.

(c) Find an inverses for any of these functions that were one-to-one.

**Problem 2.** Consider the function  $f(x) = x^4$ .

(a) Is this one-to-one?

(b) Can you find a smaller, restricted domain on which it's one-to-one?

(c) Find an inverse on your restricted domain.

(d) Can you find a completely different restricted domain? Find an inverse on that domain.

**Problem 3.** Consider  $f(x) = \cos(x)$ .

(a) Is this function one-to-one? Why or why not?

(b) What domains can you restrict it to to get a one-to-one function?

(c) What value “should” you pick to solve  $\cos(x) = 0$ ? What about  $\cos(x) = 1$ ?  $\cos(x) = -1$ ?

(d) What domain should you pick to create an inverse?

**Problem 4.** Let  $f(x) = x^5 + x$ .

- (a) Is this function one-to-one? You won't be able to prove it directly from the definition, but you can use calculus to make a clear argument.
- (b) Can you find an inverse for this function?
- (c) Can you find  $f^{-1}(2)$ ?  $f^{-1}(34)$ ?  $f^{-1}(-2)$ ?
- (d) Can you find  $(f^{-1})'(2)$ ?
- (e) Can you find  $(f^{-1})'(34)$ ?  $(f^{-1})'(-2)$ ?