Math 103: Review

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Outline

Functions

Definition

A **function** is a rule that assigns to each element x of a set D exactly one element, called $f(x)$, in a set E. D is called the **domain** and E is called the **range**.

Example: $f(x) = 2 - x^2$

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If f is a function from $\mathbb{R}$ to $\mathbb{R}$ then the set of all pairs $(x, f(x))$ in the plane is the **graph of f**.

Vertical Line Test

Vertical line test: A curve in the xy-plane is the graph of a function of x if and only if no vertical line intersects the curve more than once.

Graphs to Know

1. lines
2. parabolas
3. $y = x^n$
4. $y = \sqrt{x}$
5. trig functions
6. $y = \frac{1}{x}$
7. $y = 2^x$

Shifts

If $c > 0$ the graph of

1. $y = f(x) + c$ is the graph of $y = f(x)$ shifted c up.
2. $y = f(x) - c$ is the graph of $y = f(x)$ shifted c down.
3. $y = f(x + c)$ is the graph of $y = f(x)$ shifted c left.
4. $y = f(x - c)$ is the graph of $y = f(x)$ shifted c right.

Function Composition

Definition

Given two functions $f : X \to Y$ and $g : Y \to Z$, g **composted with** f is the function where you apply f to x and then you apply g to the result.

Sine and Cosine

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Know the common values of sine and cosine