Math 141A Spring 2014

Function Summary

1. Basic Function Groups

Name	Formula	Domain	Range	VA	HA
polynomial	$c_n x^n + c_{n-1}x^{n-1} + ... + c_1 x + c_0$ $c_n, c_{n-1}, ..., c_1, c_0 \in \mathbb{R}$, $n \in \mathbb{Z}^+$	$\mathbb{R}$	varies	no	no
rational	$\dfrac{p(x)}{q(x)}$ p and q polynomials	varies	varies	maybe	maybe
power	x^p, $p \in \mathbb{R}$	varies	varies	maybe	maybe
trigonometric					
	$\sin x$, $\cos x$	$\mathbb{R}$	$-1 \leq y \leq 1$	no	no
	$\tan x$, $\sec x$, $\csc x$, $\cot x$	varies	varies	yes	no
exponential	b^x, $b > 0$	$\mathbb{R}$	$y > 0$	no	$y = 0$
logarithm	$\log_b(x)$, $b > 0$	$x > 0$	$\mathbb{R}$	$x = 0$	no

2. Algebra of Functions

Let $f(x) = \sin(x)$ and $g(x) = x^2 - 2$ for the examples given in the table below.

Operation	Notation	Formula	Example
sum	$(f+g)(x)$	$f(x) + g(x)$	$(f+g)(x) = \sin(x) + x^2 - 2$
difference	$(f-g)(x)$	$f(x) - g(x)$	$(f-g)(x) = \sin(x) - x^2 + 2$
product	$(fg)(x)$	$f(x) \cdot g(x)$	$(fg)(x) = \sin(x) \cdot (x^2 - 2)$
quotient	$\left(\dfrac{f}{g}\right)(x)$	$\dfrac{f(x)}{g(x)}$	$\left(\dfrac{f}{g}\right)(x) = \dfrac{\sin(x)}{x^2-2}$
composite	$(g \circ f)(x)$	$g(f(x))$	$(g \circ f)(x) = (\sin(x))^2 - 2$