Math 13 Review for Test 1

Functions
Know how to find the natural domain.
Know how to find compositions of given functions.
Know how to show that two function are inverses of each other.

Problems: p.25#3d,5a; p.250 #1d

Exponential and Logarithmic Functions
Know how to find exponentials and logs.
Know the laws of exponents and logs.

Problems: p.260#9,15

Trig Functions
Know radian versus degree measure.
Know the definitions of \( \sin \theta \) and \( \cos \theta \) using the unit circle.
Know the definitions of the other trig functions.
Know the trig function for the familiar angles (0, \( \pi/6 \), \( \pi/4 \), \( \pi/3 \), \( \pi/2 \), etc.).
Know the definitions of \( \sin^{-1}x \) and \( \tan^{-1}x \).

Problems: p.A47#5b,15c; p.273#3,13a

Limits and Continuity
Know how to find limit from the graph of a function.
Know how to compute limits using properties.
Know how to find discontinuities and determine continuity on an interval.

Problems: p.118#2; p.130#9,21,25; p.136#7,13,19,23,27; p.157#19,21,23

Derivatives
Know how to state and use the definition of the derivative.
Know how to use the derivative rules.
Know how to do implicit differentiation.

Problems: p.188#16; p.203#5,7,13; p.209#11,21,31; p.267#7,25; p.274#27a,31; p.217#17

Applications of the Derivative
Know how to do related rates problems.
Know how to write an equation of the tangent line to \( y = f(x) \) at a point.
Know how to find the intervals on which a function is increasing/decreasing.
Know how to find critical numbers and relative extrema.
Know how to determine concavity and inflection points.

Problems: Related rates problems assigned in class; 198#43; 298#21; 306#33

Proofs to Know
1. If \( f \) is differentiable at \( x = c \), then \( f \) is continuous at \( x = c \).
2. Know how to prove \( \lim_{h\to0} \frac{\sin h}{h} = 1 \) and \( \lim_{h\to0} \frac{\cos h - 1}{h} = 0 \).

Study class notes, homework, and quizzes