

Worksheet 3: Limits and Derivatives

18.01 Fall 2009

Problem 1. Find the derivative of $\cos x$ from the definition of the derivative. You will probably need to use the trigonometric limits mentioned in lecture.

Problem 2. Compute the following limits

a) $\lim_{x \rightarrow 0} \frac{x^2}{\sin x}$

b) $\lim_{x \rightarrow 5} (5y + 3x + 2)$

c) $\lim_{s \rightarrow 0} \frac{\cos(\pi/2+s) - \cos(\pi/2)}{s}$

d) $\lim_{x \rightarrow \pi/3} \frac{\cos(x) - 0.5}{x - \pi/3}$

Problem 3. Suppose $f'(3) = 5$, $g'(3) = 2$, and $f(3) = g(3) = 2$. Compute

a) $(fg)'(3)$

b) $(f/g)'(3)$

c) $(3f - g'(3) * g)'(3)$