SI Session: June 16th
Mondays – Thursdays
12:30 PM – 2:00 PM
Room 1229

Prof. Stockton : Calculus I
Summer I 2008
SI Leader : Neil Jody

[1] Find the discontinuities of each function *without using a calculator*. Classify each discontinuity as removable or nonremovable. Identify all vertical and horizontal asymptotes.

(a) $g(\theta) = \dfrac{\tan\theta}{\theta}$

(b) $g(x) = \dfrac{|x+1|}{x^2 - 3x - 4}$

(c) $h(x) = \dfrac{4 - x^2}{x^2 - x - 6}$

(d) $k(x) = \begin{cases} \frac{2}{x+3} & \text{if } x < -1 \\ x^2 - 2x & \text{if } x \geq -1 \end{cases}$

[2] Evaluate each limit *without using a calculator*. Your answer should be a number, $\infty$,$-\infty$, or DNE.

(a) $\lim_{x\to\infty} \dfrac{\sin\sqrt{x}}{\sqrt{x}}$

(b) $\lim_{x\to 0^+} \dfrac{-2\cos x}{\sin 5x}$

(c) $\lim_{x\to 0} \dfrac{\dfrac{1}{x+2} - \dfrac{1}{2}}{x}$

(d) $\lim_{x\to 3} \dfrac{\sin(x-3)}{x^2-9}$

[3] Use the definition of derivative to find the derivative of each function.

(a) $h(x) = \dfrac{1}{\sqrt{x}}$

(b) $g(x) = \sqrt{3x - 2}$

(c) $k(x) = \cos x$

[4] Find the derivative of each function.

(a) $f(x) = 2x^3 - x^2 + 3x$

(b) $y = \dfrac{5}{(2x)^3} + 2\cos x$

(c) $f(x) = x^2 - 3x - 3x^{-2}$

(d) $h(x) = \dfrac{2x^2 - 3x + 1}{x}$

(e) $f(x) = \dfrac{2}{\sqrt[3]{x}} + 3\cos x$

[5] Find an equation of the line tangent to the graph of $f(x)=\dfrac{x^3+1}{\sqrt{x}}$ at the point corresponding to $x=1$.

[6] Let $f(x)=\sqrt[3]{x-2}$. Let $L=\lim_{x\to 3} f(x)$. (a) Find the value of *L*. (b) Find the largest real number $\delta>0$ such that if $0<|x-3|<\delta$ then $|f(x)-L|<0.2$.