SI Session: February, 10th &12th, 2009
Tuesdays: 3:30 PM – 5:00 PM
Thursdays: 1:30 PM – 3:00 PM
& 3:30 PM – 5:00 PM
Room 1245 SNAD

Prof. Stockton : Calculus I
Spring 2009
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.

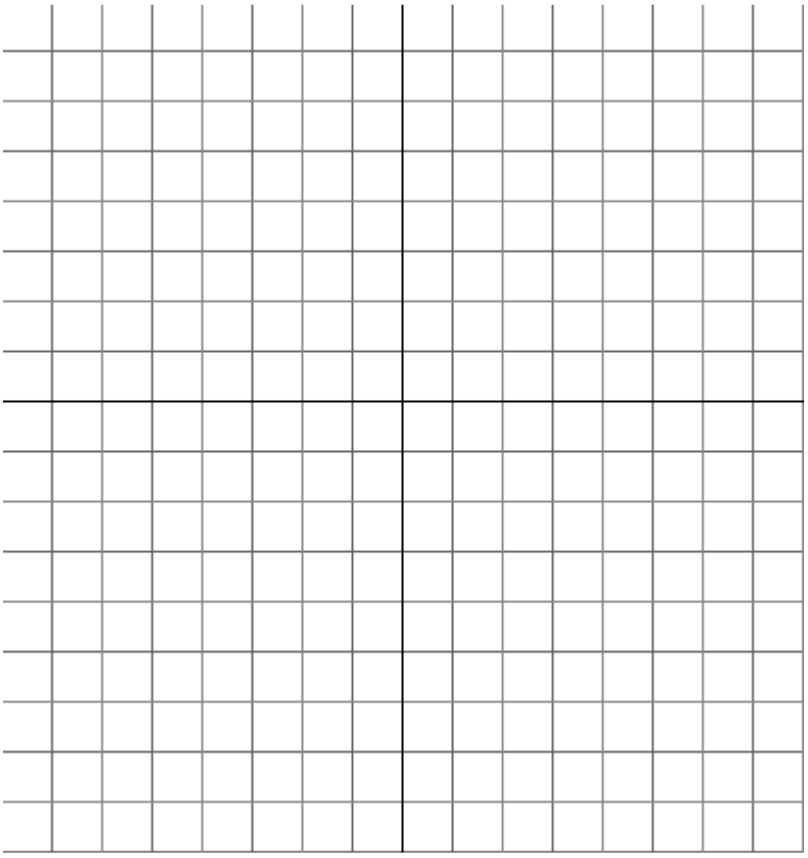
(a) $g(\theta) = \dfrac{\tan\theta}{\theta}$

(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] 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 $|f(x) - L| < 0.2$.



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

(a) $\lim_{x \to +\infty} \left(4 + \frac{3}{x}\right)$

(b) $\lim_{x \to -\infty} \dfrac{x}{\sqrt{x^2+1}}$

(c) $\lim_{x \to -\infty} \dfrac{-3x+1}{\sqrt{x^2+x}}$

(d) $\lim_{x \to +\infty} \dfrac{x-\cos x}{x}$

(e) $\lim_{x\to+\infty} \cos\left(\frac{1}{x}\right)$

(f) $\lim_{x\to\infty} \frac{5x^3+2x-1}{4-x^2}$

(g) $\lim_{x\to-\infty} \frac{2x-3}{\sqrt{3+2x^2}}$

(h) $\lim_{x\to\infty} \frac{3x^2-5x}{4-2x^3}$

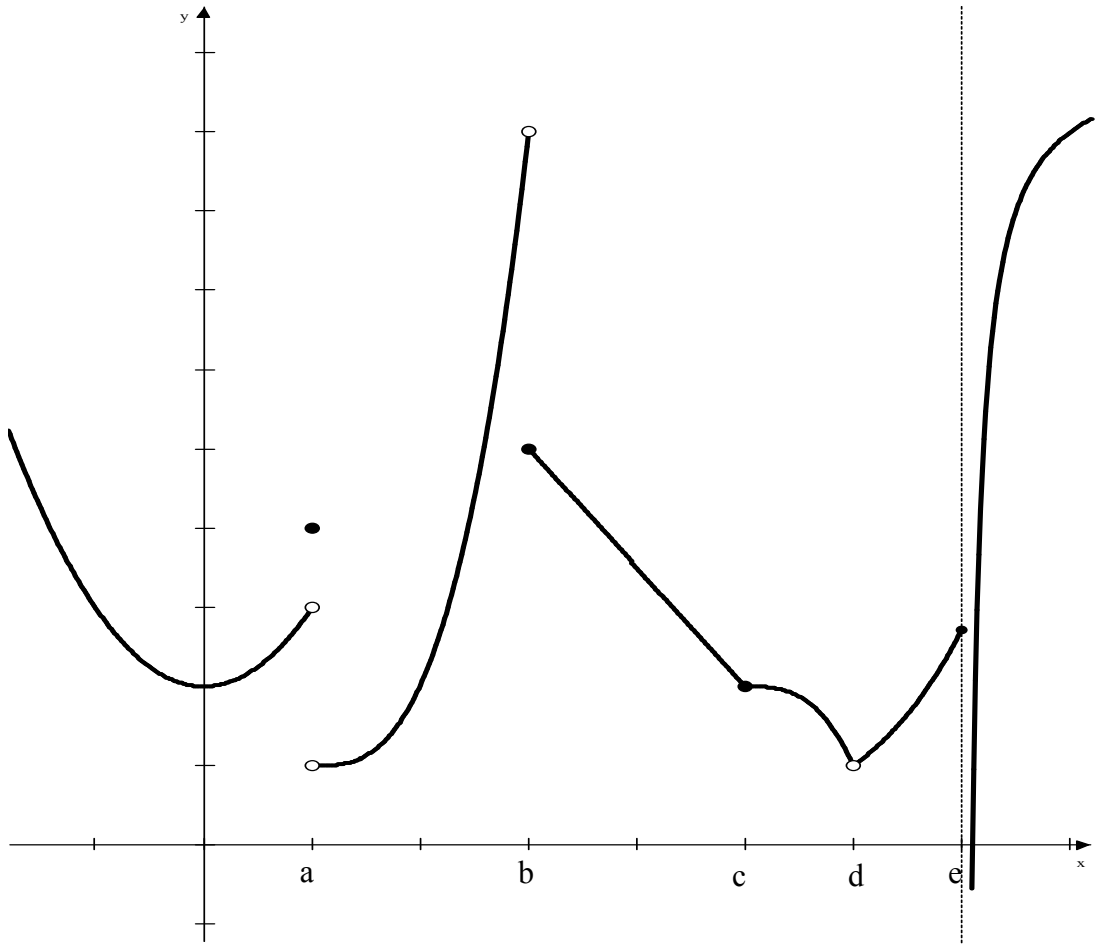
(i) $\lim_{x\to\infty} \dfrac{\sin\sqrt{x}}{\sqrt{x}}$

(j) $\lim_{x\to-\infty} \dfrac{|x+2|}{2x+3}$

(k) $\lim_{x\to-\infty} \dfrac{x}{\sqrt{x^2+1}}$

(l) $\lim_{x\to-\infty} \dfrac{\sqrt{5x^2-2}}{x+3}$

[4] Let f be the function whose graph is shown below. Use the graph to describe the continuity of f at the points a, b, c, d, and e. If f is continuous, explain why. If f is not continuous, explain why and classify the discontinuity as removable/nonremovable.



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

(a) $\lim_{x\to 0}\dfrac{\csc 2x}{\cot x}$

(b) $\lim_{x\to 0}\dfrac{\sin^2 2x}{x^2}$

(c) $\lim_{x\to 0}\dfrac{\sin x}{1+\cos x}$

(d) $\lim_{x\to 1^-}\dfrac{x+1}{x^2-1}$

(e) $\lim_{x\to 2}\dfrac{x^3-8}{x^2-4}$

(f) $\lim_{x\to -3} \dfrac{x^2+2x-3}{x^2+7x+12}$

(g) $\lim_{x\to 0} x^2 \csc^2 x$

(h) $\lim_{x\to 0} x \cot x$

(i) $\lim_{x\to 0} \dfrac{x \csc 2x}{\cos 7x}$

(j) $\lim_{x\to 5} \dfrac{\dfrac{1}{x}-\dfrac{1}{5}}{x-5}$

(k) $\lim_{x\to -3}\sqrt[3]{\dfrac{x+3}{x^3+27}}$

(l) $\lim_{x\to 0}\dfrac{2\cos x+3x-2}{5x}$

(m) $\lim_{x\to 0}\dfrac{2\sin^2 x+\sin 2x}{3x}$

(n) $\lim_{x\to 0}\dfrac{x\sin x}{1-\cos x}$