Math 1A First Midterm
Thu 27 Sept 2012 11:10–12:30 PM

Your Name: _____

Circle your section number:

Section	Time	GSI
201	MWF 8–9	Raymond Christopher
202	MWF 8–9	Jakub Kominiarczuk
203	MWF 9–10	Jakub Kominiarczuk
204	MWF 9–10	Xin Jin
205	MWF 10–11	Xin Jin
206	MWF 11–12	Khoa Nguyen
207	MWF 12–1	Khoa Nguyen

Section	Time	GSI
208	MWF 1–2	Thunwa Theerakarn
209	MWF 2–3	Thunwa Theerakarn
210	MWF 4–5	Andrew Dudzik
211	MWF 4–5	Raymond Christopher
212	MWF 5–6	Andrew Dudzik
213	MF 10–12	Yuhao Huang

Instructions

(1). Check that you have all 7 pages of this exam booklet.

(2). Be sure to show all your steps. *In particular, a "yes" or "no" or numerical answer by itself is never sufficient.* When in doubt, over-explain rather than under-explain.

(3). Calculators are not allowed.

(4). Check your work as time allows.

(5). You may not use anything that has not been covered in the course or its prerequisites. In particular you are not allowed to use l'Hospital's Rule.

EXAM SCORES		
Problem	Max	Your Score
1	10	
2	5	
3	6	
4	9	
5	14	
6	6	
Total	50	

1. (10 points) Find the following limits:

(a). $\lim_{x \to 1} \dfrac{x^2 + 7x - 8}{x^3 - 1}$

(b). $\lim_{x \to -2^+} \dfrac{1}{x^2 - 4}$

(c). $\lim_{x \to \infty} \tan^{-1}\left(\dfrac{x^2 + 2x + 7}{x^2 + 6x}\right)$

2. (5 points) (a). Find a formula for the inverse of the function

$$f(x) = \sqrt{2 + 3x} \, .$$

(b). State the domain and the range of f^{-1}.

3. (6 points) Use the Squeeze Theorem to find

$$\lim_{x \to 0^+} x \tan\big(\sin(\ln x)\big) \, .$$

4. (9 points) Find the vertical and horizontal asymptotes of the curve

$$y = \frac{\sqrt{x^6 + 4x^5 + 3x} - x^3}{x^2 - x}.$$

5. (14 points) Find the following derivatives, given that $\frac{d}{dx}(\ln x) = \frac{1}{x}$:

(a). $\frac{d}{dx}\left(x^3 + 4x + 2\sqrt[3]{3x}\right)$

(b). $\frac{d}{dx}\left(\frac{\sqrt{x}+1}{\sqrt{x}-1}\right)\Big|_{x=4}$

(c). $\frac{d}{dx}\left(e^x + \frac{3x^3+2x}{(x^2+7)(x^3-1)}\right)$

(d). $\frac{d}{dx}\left(x^6 e^x \ln x\right)$

6. (6 points) If a ball is thrown into the air with a velocity of 32 ft/s, its height in feet after t seconds is given by $y = 32t - 16t^2$.

(a). The ball will be at maximum height when its instantaneous velocity is zero. At what time will this occur?

(b). Find the average velocity from the time it is thrown ($t = 0$) to the time it reaches its maximum height.