MATH V1201 PROBLEM SET 9
DUE NOVEMBER 24, 2009.

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Revision. The problems on §14.8 are due December 3. All other problems are due November 24.

(1) In the textbook:

(§14.7) 4, 9, 16, 19, 34, 41, 54.

Read (but you don't have to do): 37, 38, 55.

(§14.8) 3, 5, 9, 23, 29.

(2) Some more practice with limits...

- Use polar coordinates to compute
$$\lim_{(x,y)\to(0,0)} \frac{x^3y + x^2y^2}{x^2+y^2}.$$
- Use polar coordinates to compute
$$\lim_{(x,y)\to(3,4)} \frac{(x-3)^2(y-4)}{\sqrt{(x-3)^2+(y-4)^2}}$$
Hint: first substitute $u = x-3$, $v = y-4$.
- Use the "approaching from various directions" technique to show that
$$\lim_{(x,y)\to(2,5)} \frac{(x-2)(y-5)}{(x-2)^2+(y-5)^2}$$
does not exist.
- Does
$$\lim_{(x,y)\to(-1,1)} \frac{x^2-y^2+2x+2y}{x^2+2x+1+y^2-2y+1}$$
exist? Why or why not?

(3) ...and continuity:

- Define a function
$$f(x,y) = \begin{cases} \frac{x^2}{\sin(y)} & \text{if } y \text{ is not a multiple of } \pi \\ 0 & \text{if } y \text{ is a multiple of } \pi. \end{cases}$$
At what points is f continuous? Discontinuous?
- Define a function
$$f(x,y) = \begin{cases} x^2/y & \text{if} y \neq 0 \\ 0 & \text{if} y = 0. \end{cases}$$
At what points is f continuous? Discontinuous?

If you had trouble with	Do problems
14.7.4	14.7.1–3
14.7.9, 16	14.7.5–18
14.7.19	14.7.20
14.7.34	14.7.29–36
14.7.41	14.7.39–51
14.7.54	
14.8.3, 5, 9	14.8.1–17
14.8.23	14.8.24
14.8.29	14.8.40–42

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