Wednesday Math 135 review problems for section F2

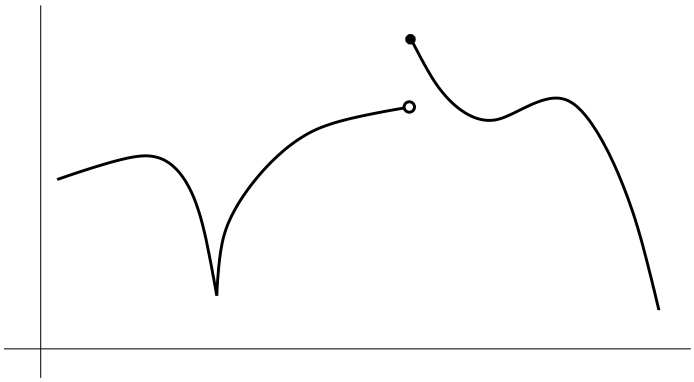
Continuity & differentiability

1. Here $f(x) = \begin{cases} x+3 & \text{if } x \le -2 \\ \frac{1}{2}x^2 + A & \text{if } -2 < x \end{cases}$ where A is a constant to be determined. Find A so that $f(x)$ is continuous for all values of x. Sketch a graph of $y = f(x)$ using that value of A for $-4 \le x \le 2$. Is $f(x)$ differentiable at $x = -2$ using that value of A?

2. Here $f(x) = \begin{cases} Ax^2 - 1 & \text{if } x < -1 \\ x + B & \text{if } -1 \le x \le 1 \\ 2 & \text{if } 1 < x \end{cases}$ where A and B are constants to be determined. Find numbers A and B so that $f(x)$ is continuous for all values of x. Sketch a graph of $y = f(x)$ for $-3 \le x \le 3$.

3. In this problem $f(x) = \begin{cases} 1 + x^2 & \text{if } x < 2 \\ A + Bx & \text{if } -2 \le x < 1 \\ x^2 & \text{if } x \ge 1 \end{cases}$. Find A and B so that $f(x)$ is continuous at all points. Sketch a graph of $y = f(x)$ for $-3 \le x \le 3$. For which values of x is $f(x)$ *not* differentiable?

4. In the graph of $y = f(x)$ to the right, identify with **m** any point which is a relative minimum; **M** any point which is a relative maximum; **C** any point which is a critical point; **I** any point which is an inflection point; **NC** any point at which $f(x)$ is *not* continuous; and **ND** any point at which $f(x)$ is *not* differentiable. Some points may have more than one label.



LEFTOVERS

Log/exp etc.

1. Find the range of $f(x) = e^{-2x} + e^{3x}$.
2. Find the range of $f(x) = \frac{\ln(x^2+1)}{x^2+1}$.