Monday Math 135 review problems for section F2

These problems are mostly from previous Math 135 finals. Almost any Math 135 final will have problems covering this material.

Definition of derivative

1. Write the definition of derivative as a limit and *use this definition* to find the derivative of $f(x) = x^2 - x$.
2. Write the definition of derivative as a limit and *use this definition* to find the derivative of $f(x) = \frac{1}{3x+4}$.
3. Write the definition of derivative as a limit and *use this definition* to find the derivative of $f(x) = 4 + 3x^2$.
4. Write the definition of derivative as a limit and *use this definition* to find the derivative of $f(x) = \sqrt{1-2x}$.

Computations of limits

1. Evaluate the limits exactly. Give brief evidence supporting your answers which is not based on a calculator graph or calculator computations.

a) $\lim_{x\to\infty} \frac{2x^2-5}{3x^2+1}$ b) $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2}$ c) $\lim_{x\to 5} \frac{x^2-3x-10}{x-5}$ d) $\lim_{x\to+\infty} \frac{2x^3-x+3}{x^3+2}$ e) $\lim_{x\to 2^-} \frac{x^2-4}{|2-x|}$ f) $\lim_{x\to 2^+} \frac{x^2-4}{|2-x|}$

2. Find the equations of all vertical and horizontal asymptotes of $f(x) = \frac{\sqrt{x^2+4}}{x-3}$.
3. Find the equations of all vertical and horizontal asymptotes of $f(x) = \frac{3+5e^{-2x}}{7-e^{-2x}}$.

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