Math 190 – Spring 2017
Assignment G9
First submission: Today in class
Final submission: Thursday, Mar 9

Names: _____
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(1) Find the maximum and minimum values on the functions below:

    a. $f(x) = x^3 - 12x$ on $[0, 4]$

    b. $f(x) = \begin{cases} 2 - x^2, 1 \le x \le 3 \\ 2 - 3x, 3 < x \le 5 \end{cases}$ on $[1, 5]$

(2) Use the second derivative test to find all maximum and minimum values of the functions below on the given intervals.

    a. $f(x) = 2x^3 + 2x + 1$ on $[-10, 10]$

    b. $f(x) = \frac{1}{1+x^2}$ on $[-4, 4]$

(3) Use the second derivative test to find all maximum and minimum values of the function $f(x) = \frac{1}{1-x^2}$ on the interval $(-1, 1)$.

(4) Use either the first or the second derivative test to find all maximum and minimum values of the functions below.
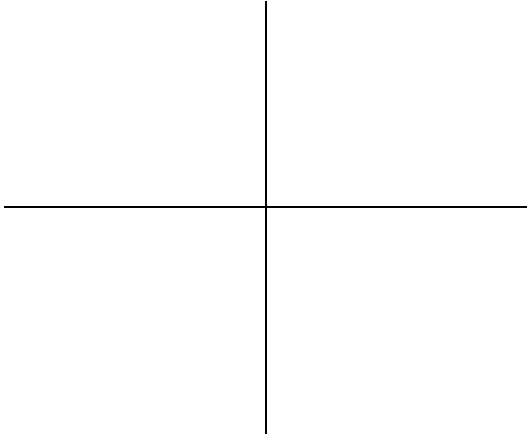
    a. $f(x) = \frac{x^2+1}{x^2-1}$

    b. $f(x) = 2x^3 + 2x + 1$ on $[-10, 10]$

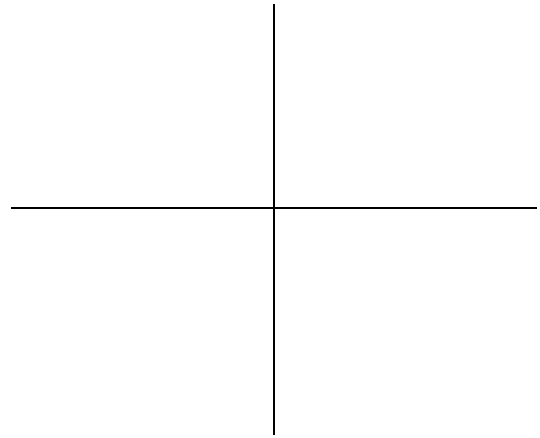(5) Sketch graphs of the four functions with ALL of the properties listed.

a.
- $f(2) = f(4) = 0$
- $f'(x) < 0$ for $x < 3$
- $f'(3)$ DNE
- $f'(x) > 0$ for $x > 3$
- $f''(x) < 0$ when $x \neq 3$

c.
- $f(0) = f(2) = 0$
- $f'(x) > 0$ for $x < 1$
- $f'(1) = 0$
- $f'(x) < 0$ for $x > 1$
- $f''(x) < 0$ everywhere

d.
- $f(0) = 0$
- $f'(0) = 0$ for $x = -5, 0, 5$
- $f(x)$ has vertical asymptotes at $x = \pm 3$
- $f'(x) < 0$ on (-5, -3), (-3, 3) and (3,5)
- $f'(x) > 0$ on (-∞, -5) and (5,∞)
- $f''(x) > 0$ on (-3, 0) and (3,∞)
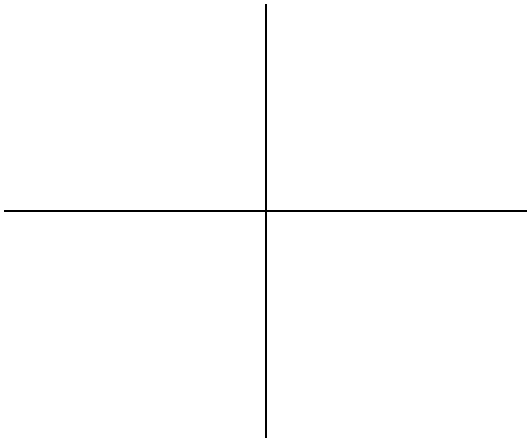- $f''(x) < 0$ on (-∞, -3) and (0,3)

b.
- $f(2) = f(4) = 0$
- $f'(x) > 0$ for $x > 3$
- $f'(3)$ DNE
- $f'(x) < 0$ for $x < 3$
- $f''(x) > 0$ when $x \neq 3$