Name: SOLUTIONS

Quiz #10 - November 9, 2006

1. Let

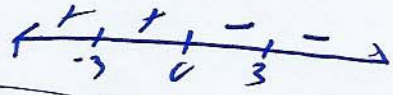
$$f(x) = \frac{1}{x^2 - 9}$$

Find the intervals on which $f(x)$ is increasing/ decreasing. Find the intervals on which $f(x)$ is concave up/concave down. Determine all local maximums and/or minimums and inflection points. Also any asymptotes and x or y intercepts. Then use this information to neatly sketch and clearly label the graph of $y = f(x)$.

$\lim_{x\to\pm\infty} f(x) = 0$ so $y = 0$ is H.A.

V.A at $x = \pm 3$ $\quad \lim_{x\to 3^+} f = \infty \quad \lim_{x\to -3^+} = -\infty$ $\quad \lim_{x\to 3^-} f = -\infty \quad \lim_{x\to 3^-} = \infty$

$f'(x) = \frac{-2x}{(x^2-9)^2}$ crit #'s, $-3, 0, 3$

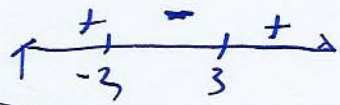


incr $(-\infty, -3)\ \cup (-3, 0)$

dec $(0, 3)\ \cup (3, \infty)$

local max $(0, -1/9)$

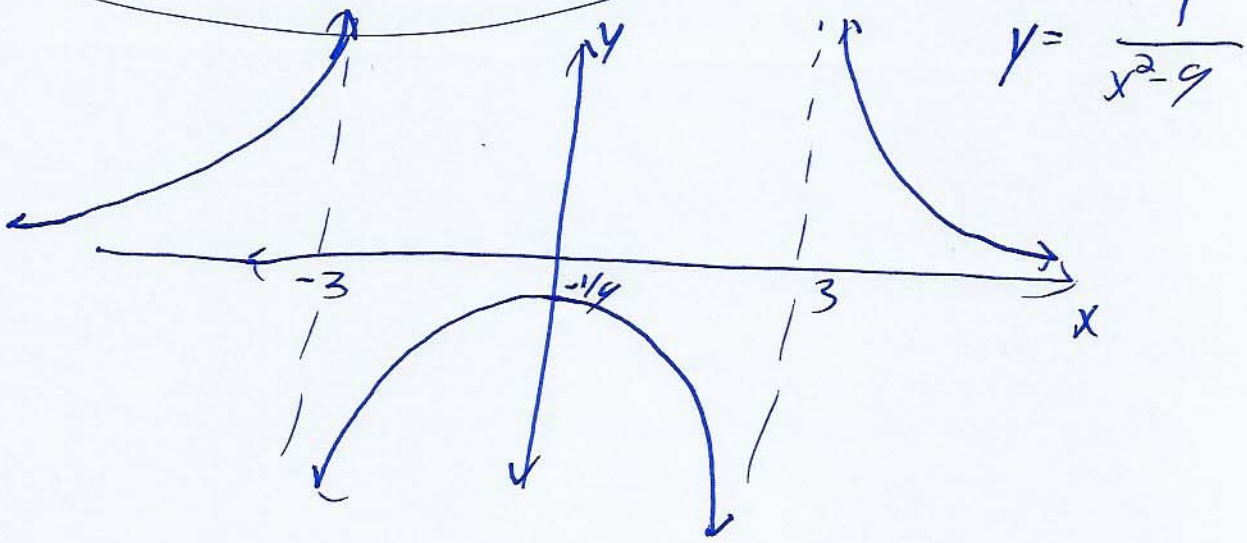
$f''(x) = \frac{-2(x^2-9)^2 + 2x \cdot 2(x^2-9)(2x)}{(x^2-9)^4} = \frac{-2(x^2-9) + 8x^2}{(x^2-9)^3} = \frac{6x^2+18}{(x^2-9)^3}$ Never 0



NO I.P.

concave up $(-\infty, -3)\ \cup (3, \infty)$

concave down $(-3, 3)$



$y = \frac{1}{x^2-9}$