

Mathematics 1500 Tutorial #7

1. Let $f(x) = \frac{x}{x^2 + 4}$. Then $f'(x) = \frac{4 - x^2}{(x^2 + 4)^2}$ and $f''(x) = \frac{2x(x^2 - 12)}{(x^2 + 4)^3}$.

- a) Compile the following information about f and its graph. (Give answers only; answer "NONE" if the function does not display a feature listed).
 Domain? y-intercept? x-intercepts? symmetry? equation(s) of vertical asymptotes? equation(s) of horizontal asymptotes? critical numbers(s) of the function? interval(s) where the function is increasing? interval(s) where the function is decreasing? coordinates of any local minima? coordinates of any local maxima? interval(s) where the function is concave up? interval(s) where the function is concave down? coordinates of inflection points?
- (b) Use the above information to sketch the graph of $y = f(x)$. Indicate all pertinent information on your graph

2. Let $f(x) = \frac{9(3 - x^2)}{x^3}$. Then $f'(x) = \frac{9(x^2 - 9)}{x^4}$ and $f''(x) = \frac{-18(x^2 - 18)}{x^5}$.

- a) [JUSTIFY ALL YOUR ANSWERS.]

Compile the following information about f and its graph.

Domain? symmetry? y-intercept? x-intercepts? equation(s) of vertical asymptotes? equation(s) of horizontal asymptotes? critical numbers(s) of the function? interval(s) where the function is increasing? interval(s) where the function is decreasing? coordinates of any local minima? coordinates of any local maxima? interval(s) where the function is concave up? interval(s) where the function is concave down? coordinates of inflection points?

- (b) Use the above information to sketch the graph of $y = f(x)$. Indicate all pertinent information on your graph