

*Using derivatives to graph a function without a calculator #3*

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

- a. Find the x intercepts.
- b. Find the y intercepts
- c. Find any asymptotes (horizontal and vertical)
- d. Find the end behavior.
- e. Find the first derivative (get a common denominator).
- f. Find the critical points. (hint: set numerator=0 and denominator = 0)
- g. Use the critical points to find any max/mins. (hint: use a sign line)
- h. State intervals of increase and decrease.

- i. Find the second derivative (get a common denominator).
  
  
  
  
  
  
  
  
  
  
- j. Find all possible points of inflection. (hint: numer = 0 and denom = 0)
  
  
  
  
  
  
  
  
  
  
- k. Find intervals of concavity. (hint: use a sign line)
  
  
  
  
  
  
  
  
  
  
- l. Sketch the graph of  $f(x)$ . Label intercepts, asymptotes, and max/mins.

