

# CHAPTER 6 TEST

Your brain, your pen, your test. No calculators, phones, or looking around.

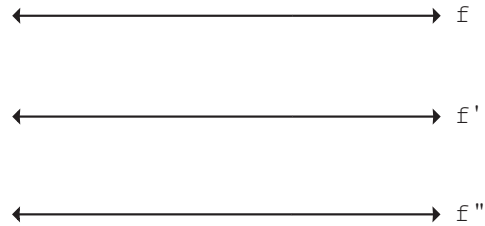
Math 231  
December 3, 2008

Name: \_\_\_\_\_  
By printing my name I pledge to uphold the honor code.

- This entire exam is about the rational function  $f(x) = \frac{x^2}{x-1}$ . We'll start with some easy facts about this function.
  - $f(x)$  is a rational function because:
  - In interval notation, the domain of  $f(x)$  is:
  - List any roots of  $f(x)$ :
  - List any holes of  $f(x)$ :
  - List any vertical asymptotes of  $f(x)$ :
  - List any horizontal asymptotes of  $f(x)$ :
- Calculate the following limits. Show all work and algebra.
  - $\lim_{x \rightarrow 1^+} f(x)$
  - $\lim_{x \rightarrow 1^-} f(x)$
  - $\lim_{x \rightarrow \infty} f(x)$
  - $\lim_{x \rightarrow -\infty} f(x)$
- $f(x)$  has a slant asymptote. Find its equation. Make sure I can tell how you found it.

4. Remember our function today is  $f(x) = \frac{x^2}{x-1}$ .

a) Make number lines for  $f$ ,  $f'$ , and  $f''$ . You MAY use the quotient rule.



b) List the  $(x, y)$ -values of any local extrema or inflection points of  $f(x)$ .

5. Make an extremely careful graph of  $f(x)$  that includes *all* of the information on both sides of this exam, including the derivative information, an accurate graph of the slant asymptote, and the locations of any interesting points on the graph.

