PreCalc BC **9- Sketching** **Name:**

1. Let a particle's position for $t > 0$ be given by $s(t) = t^2 + 2/t$

a) When is the velocity equal to zero?
b) What is the particle's position at that time?
c) What is the particle's acceleration at that time?
d) Is the acceleration ever negative? When?
e) What is the lower bound of the acceleration?

2. Use analytic means to find and classify maxima and points of inflection:
$f(x) = x^5 - 5x^3 + 3$. Make a sketch. Verify afterwards with your calculator.

3. If you jump out of an airplane without a parachute you fall faster and faster until air resistance causes you to approach a steady velocity called *terminal* velocity.

a) Sketch a graph of your descent (position) against time.

b) Explain the concavity of your graph.

c) Sketch a graph of velocity v. time.

d) Assuming air resistance to be negligible initially, what natural phenomenon is represented by the slope of your velocity graph at $0 < t <$ term. vel.

4. Put an (a) by all points of inflection if the graph at right is *f(x).*

Put a (b) by all points of inflection if the graph at right is *f '(x).*

Put a (c) by all points of inflection if the graph at right is *f "(x).*