Name:_____

## MA 2310: Quiz 6

Show all work for credit.

1. Related Rates Problem

   (a) The radius of a balloon is increasing at a ate of 3 cm/sec when the radius is 4 cm. How fast is the surface area increasing?

   (b) The volume of a balloon is increasing at a rate of 3 $cm^3$/sec when the radius is 6 cm. How fast is the surface area increasing?

   (c) Watching from the dock we see a boat moving in the center of the river (10 meters off of shore). The boat moves at a rate of 4 meters per second. When the boat is 20 meters down the river how fast is the boat moving away from us? That is, the boat is 10 meters of off the shore and 20 meters down the river.

2. Find local extrema for $f(x)$ in the following using First Derivative Test.

   (a) $f(x) = x^3 - 12x + 1$

   (b) $f(x) = (x-2)^3(2x+1)^5$

   (c) $f(x) = xe^x$

   (d) $f(x) = (x-4)^{2/3}(x+4)^5$

3. Find local points of inflection for for $f(x)$ in the following.

   (a) $f(x) = x^4 - 6x^2$

   (b) $f(x) = xe^x$