1. **(5 points)** We are deflating a spherical balloon of radius of 10 centimeters by letting 150 cubic centimeters of air out of the balloon per second. How quickly is its radius shrinking? (Note: The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$, where $r$ is the radius of the sphere.)

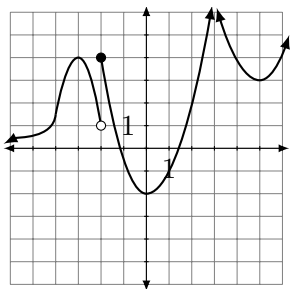
2. **(7 points)** Let $f(x) = x^3 - 3x^2 + 4$. Find the following:

   (a) **(3 points)** its critical points.

   (b) **(4 points)** its maximum and minimum on the interval $[-3, 1]$.

3. **(4 points)** Estimate $(2.005)^5$ using a well-chosen linear approximation.

4. **(4 points)** Identify, either by marking them or by giving the $x$-coordinates, which points on the this graph are local minima and maxima; *indicate which is which*. Also determine which, if any, points on the graph are absolute extrema on $(-\infty, +\infty)$; if none are, then say so.




5. **(2 point bonus)** Find a formula for a continuous function with exactly one absolute minimum and no absolute maximum on the interval $(-\infty, \infty)$, but with infinitely many local minima.