1. Answer the following true or false (2 points each).
   (a) The set of all values of the slope of the line $y = mx + 2$ for which the x-intercept exceeds $1/2$ is $m > 4$.
   (b) The following limit is -1.5
   $$\lim_{x\to 1} \frac{x^3 - 3x + 2}{x^3 - 5x^2 + 7x - 3}$$
   (c) The equation $\cos x = x$ has at least one solution.
   (d) If f and g are both continuous at 0, then the composite function $f \circ g(x) = f(g(x))$ is continuous at 0.
2. Compute the following derivatives (2 points each)
   (a) $y'(2)$ if $y = \sqrt[3]{x + \sqrt{x}}$.
   (b) $y'(\pi/4)$ if $y = \sin(\tan x)$.
   (c) $y'(1)$ if $y = e^{3x} \ln \sqrt{x}$.
3. The cissoid of Diocles is the curve given by $y^2(2 - x) = x^3$. The normal line to a curve at the point p is the line passing through p that is perpendicular to the tangent line to the curve at p. Find both the tangent line and the normal line to the cissoid at $(x, y) = (1, 1)$. (5 points)
4. The velocity of a heavy meteorite entering the earth's atmosphere is inversely proportional to $\sqrt{s}$ when it is s kilometers from the earth's center. Show that the meteorite's acceleration is inversely proportional to s^2. (5 points)
5. Starting at 4 am, a monk slowly climbed to the top of a mountain, arriving at noon. The next day, he returned along the same path, starting at 5 am and getting to the bottom at 11 am. Show that at some point along the path, his watch showed the same time on both days.