L'Hopital's rule and Optimization

November 4, 2016

Problems

Problem 1. Compute the limit $\lim_{x\to 0}(\cos 2x)^{\frac{3}{x^2}}$ using L'Hopital's rule. (Hint: use ln.)

Problem 2. Compute $\lim_{x\to 0}(1-x)\tan\left(\frac{\pi x}{2}\right)$.

Problem 3. Sketch the graph of $e^{\frac{1}{x}}$.

Problem 4. Find the point on the curve $x + y^2 = 0$ that is closest to the point $(0, -3)$.

Problem 5. A farmer has 400 feet of fencing with which to build a rectangular pen. He will use part of an existing straight wall 100 feet long as part of one side of the perimeter of the pen. What is the maximum area that can be enclosed?