1. Evaluate \( \lim_{x \to 0} \frac{\cos(x) - 1 - x^2/2}{x^2} \)

2. Evaluate \( \lim_{x \to \infty} \left(1 - \frac{3}{x^2}\right)^{2x^2} \).

3. Sketch the graph of \( f(x) \) given the following information:
   (a) \( \lim_{x \to -\infty} f(x) = 0; \lim_{x \to 1^-} f(x) = +\infty; \lim_{x \to 1^+} f(x) = -\infty \)
   (b) \( f(-2) = -2; f(0) = 0; f(3) = 1 \)
   (c) \( f'(-2) \) is undefined; \( f'(0) = 0; f'(3) = 0 \)
   (d) \( f'(x) > 0 \) if \( -2 < x < 1 \) or \( 1 < x \); \( f'(x) < 0 \) if \( x < -2 \)
   (e) \( f''(x) > 0 \) if \( 0 < x < 1 \) or \( 3 < x \); \( f''(x) < 0 \) if \( x < -2 \) or \( -2 < x < 0 \) or \( 1 < x < 3 \)

4. Find the points on the ellipse \( 4x^2 + y^2 = 1 \) that are farthest away from the point \( (1,0) \).

5. A rectangular box has a square base, and no lid. If the volume of the box is \( 128 \text{ in}^3 \), find the dimensions which minimize the amount of material required to construct the box.