1. Find the intervals on which the function \( f(x) = (x^2 - 2)e^{-x} \) for \( x > 0 \) is increasing, decreasing, concave up and concave down. Identify its inflection point, and any extrema (local max/min) and then make an appropriate sketch. Check that the horizontal axis is an asymptote to this curve.
2. Evaluate the limits below:
   a) \( \lim_{x \to \infty} \left( x^2 - 2 \right) e^{-x} \)

   b) \( \lim_{x \to \infty} \frac{-5x^2 + 24e^{-x}}{-6x^2 + 18e^{-x}} \)
c) \( \lim_{x \to \infty} \frac{\sqrt{9x^2 + 5}}{x} \)