

## [MODULE 9: CONCAVITY, LIMITS, AND CURVE SKETCHING IN A TWIST]

Name: \_\_\_\_\_

Points: \_\_\_\_\_

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)  $\lim_{x \rightarrow \infty} (x^2 - 2)e^{-x}$

b)  $\lim_{x \rightarrow \infty} \frac{-5x^2 + 24e^{-x}}{-6x^2 + 18e^{-x}}$

c)  $\lim_{x \rightarrow \infty} \frac{\sqrt{9x^2 + 5}}{x}$