Name: **Quiz 5 (Version A)**

Instructions: This quiz is closed book, closed note, and an individual effort. Electronic devices other than approved calculators are not allowed on your person (e.g., no cell phones or calculators with CAS). Answer each question. **Show all work to receive full credit.** Unless the question specifies, you may provide either an exact answer or round to two decimal places. If you get stuck, please attempt to explain what you want to do. This may give more partial credit.

1. (20 points) Answer the below for each of the following functions: (You will lose points if the question asks for a point and you give only the x-value and if you do not show all your work.)

   (a) $f(x) = 3x^5 - 5x^4 + 3$

   (b) $f(x) = xe^{-2x}$

   (a) (2 points) Find the critical **points** of $f(x)$.

   (b) (2 points) Determine which critical points are local maxima and local minima.

   (c) (1 point) Determine the intervals on which $f(x)$ is increasing and decreasing.

   (d) (2 points) Determine the inflection **points** of $f(x)$.

   (e) (1 point) Determine on which intervals $f(x)$ is concave up and concave down.

   (f) (2 points) Determine the global maxima and minima on the interval $[0, 2]$.

Back is blank if needed.

2. Extra Credit (5 points): Let the function for (1a) be the revenue function (except replace x with q and y with $R(q)$) for a company and $C(q) = \frac{14}{5}q^5 - 5q^4 + \frac{5}{3}q^3 - 4q + 1$. Determine at which quantity (or quantities) profit is maximized.