# MTH 1125 Test #3

SUMMER 2023

Pat Rossi Name _____

**Instructions.** Show CLEARLY how you arrive at your answers.

1. $f(x) = 2x^3+3x^2-36x+8$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums.

2. $f(x) = x^4 - 4x^3 - 48x^2 + 6x - 6$ Determine the intervals on which $f(x)$ is Concave up/Concave down and identify all points of inflection.

3. $f(x) = x^3 + 6x^2 - 6$ on the interval $[-3, 2]$. Find the Absolute Maximum and Absolute Minimum values (if they exist).

4. $f(x) = x^{\frac{8}{3}} - 16x^{\frac{2}{3}} - 2$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums.

5. A rectangle is to be constructed such that one side lies on the positive $y$-axis, an adjacent side lies on the positive $x$-axis, and the vertex in between is the origin. If the opposite vertex lies on the graph of $f(x) = (9-x)^2$, what should the value of $x$ be such that the area of the rectangle is as large as possible?