MTH 1125 (2 pm - Pod A) Test #3

FALL 2020

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Instructions. Show CLEARLY how you arrive at your answers.

1. $f(x) = 2x^3 + 3x^2 + 2$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums. (Caution - there are **two** critical numbers. Make sure you get them both!)

2. $f(x) = \frac{1}{4}x^4 + 2x^3 - \frac{15}{2}x^2 + 6x + 3$ Determine the intervals on which $f(x)$ is Concave up/Concave down and identify all points of inflection.

3. $f(x) = x^3 + 6x^2 - 15x + 3$ on the interval $[-2, 2]$. Find the Absolute Maximum and Absolute Minimum values (if they exist).

4. $f(x) = x^{\frac{20}{7}} - \frac{10}{3}x^{\frac{6}{7}} + 4$ Determine the intervals on which $f(x)$ is increasing/decreasing and identify all relative maximums and minimums.

5. A rectangle is inscribed in the region bounded by the positive x-axis, the positive y-axis, and the graph of $f(x) = (x-7)^6$ as shown below. Determine the value of x that makes the area of the rectangle as large as possible.

REMARK: When you create the area function $A(x)$, **do not simplify (i.e. "multiply it out") before you compute the derivative.** If you simplify (i.e. "multiply it out") the area function $A(x)$ before you compute the derivative, it will be very difficult to find the critical numbers.