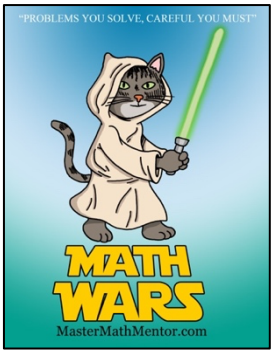
Math Wars – AB Calculus
Topic 118 – Absolute Extrema

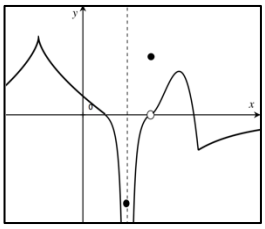


Maximum Time: 8.5 Minutes

Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url:
https://mastermathmentor.com/mmm/mathwars.ashx?key=118

When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing Submit for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many problems you got right and your time. A perfect score is all problems correct using half the maximum time or less. Text or email your friends with your results.

1. (1 pt) The graph of $y = f(x)$ is shown in the figure to the right. Which describes the number of relative extrema and whether or not the function has absolute extrema?



	A.	B.	C.	D.
Stationary Pt.	1	1	2	1
Relative Minima	1	0	1	0
Relative Maxima	2	1	2	1
Absolute Minimum	no	no	yes	no
Absolute Maximum	yes	yes	no	no

2. (3 pts) Find the difference between the absolute maximum and absolute minimum value of $f(x) = 9x^2 - 2x^3 + 1$ on $[0, 4]$.

A. 1 B. 4 C. 11 D. 27

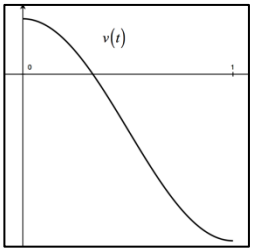
3. (5 pts) Find the difference between the absolute maximum and absolute minimum value of $f(x) = \ln(2x^3 + 3x^2 + 9)$ for $-2 \le x \le 0$.

A. 1 B. ln 5 C. ln10 D. ln 2

4. (7 pts) Find the difference between the largest and smallest slope to $f(x) = 40x^3 - 3x^5$

A. 2 B. $2\sqrt{2}$ C. 240 D. $256\sqrt{2}$

5. (9 pts) A particle moves along the *x*-axis such that its position is given by $x(t) = 2\sin(\pi t) - \pi t$ for $0 \le t \le 1$. The graph of its velocity is shown on the figure to the right. Find the maximum distance the particle gets from its starting position.



A. $\frac{1}{3}$ B. $\sqrt{3} - \frac{\pi}{3}$

C. $\frac{\pi}{6} - 1$ D. π