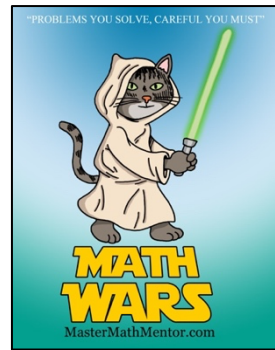


Math Wars – AB Calculus

Topic 115 – Function Analysis



Maximum Time: 8 Minutes

Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url:

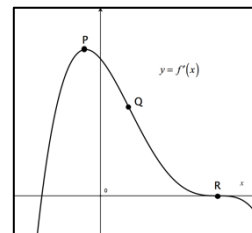
<https://mastermathmentor.com/mmm/mathwars.ashx?key=115>

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. You can text or email your friends with your results.

1. (1 pt) If $f'(x) = \frac{x(x-1)^2(x-2)}{x+3}$, how many extrema does $f(x)$ have?

- A. 1 B. 2 C. 3 D. 4

2. (3 pts) The graph to the right is $y = f'(x)$. If $g(x) = x \cdot f'(x)$, determine the signs of $g'(x)$ at points P, Q and R and arrange from highest to lowest.



- A. P, Q, R B. P, R, Q
C. Q, R, P D. R, P, Q

3. (5 pts) Let $f(x) = x^{2p} + x^{2q} + x^{2r}$ where $p, q,$ and r are positive integers. Which of the following is true if $x < 0$?

- I. $f(x)$ is decreasing II. $f'(x)$ is decreasing III. $f''(x)$ is decreasing
- A. II only B. I and II only C. I and III only D. II and III only

4. (7 pts) If $f'(x) = e^{2x}(x^2 - 2x - 11)$, for what value of x is f increasing and an inflection point?

- A. $x = -3$ only B. $x = -4$ only C. $x = -3$ and $x = -4$ D. no value

5. (9 pts) If $f'(x) = (\sin x + 2)\ln(x + 2)(1 - e^{x-4})(-2^{x-1})$, then f has which of the following extrema?

- A. Relative minimum at $x = -1$ and relative maximum at $x = 4$
B. Relative maximum at $x = -1$ and relative minimum at $x = 4$
C. Relative minimum at $x = -1$ only
D. Relative minimum at $x = 4$ only