

DIGITLE – AB CALCULUS

Puzzle 115 – Absolute Extrema



Directions: The first 5 problems have single digit answers. The 6th problem has a 5-digit answer (counting leading zeros if present). You have a choice: solve the easier single-digit answer problems or tackle the more difficult 5-digit answer. Once you have done that, attempt to solve the puzzle by entering the following url on your computer, tablet, or phone:

<https://mastermathmentor.com/mmm/digitle.ashx>.

The correct puzzle answer will be the digits of your answer(s) scrambled. Use the following interpretation. You get 6 tries.

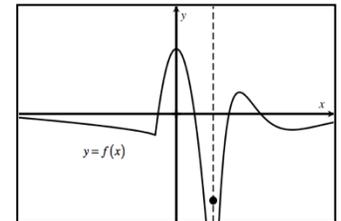
Green : the digit is in the answer and is in the correct spot.
Yellow: the digit is in the answer but is not in the correct spot.

Grey : the digit is not in the answer.

Single Digit Answers:

1) The difference in maximum acceleration and minimum acceleration attained on the interval $0 \leq t \leq 16$ by the particle whose velocity is given by $v(t) = \frac{t^{5/2}}{80} - \frac{t^{3/2}}{4}$ is

2) The graph of a continuous function having four x -intercepts is shown in the figure to the right. Assign 3 points for each absolute maximum or absolute minimum, 2 points for each relative maximum and 1 point for each relative minimum. How many points are assigned to this graph?



3) What is the difference in x -values where $f(x) = \ln(x^4 - 8x^3 + e^7)$ on $[0, 9]$ where f has its absolute extrema?

4) The function $f(x) = ax^4e^{-x}$, where a is a positive constant, defined on $[-1, \infty)$, has an absolute maximum of $\frac{256}{e^4}$. Find the value of a .

5) Find the absolute maximum value of $f(x) = \sin^2 x - \sin x$.

5-Digit Answer:

6) If $f(x) = 1936|x^2 + 2x - 15|$ on $[-6, 6]$, the difference between the function's *absolute* maximum and *relative* maximum is