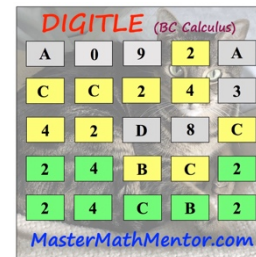


DIGITLE – BC CALCULUS

Puzzle 201 – Indeterminate Forms



Directions: The first 5 problems have single digit or letter answers. The 6th problem has a 3-digit answer (counting leading zeros if present). You have a choice: solve the easier single-character answer problems or tackle the more difficult 3-digit answer and the multiple choice. 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/letters 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) Find $\lim_{x \rightarrow 0} \left(\csc 2x - \frac{1}{2x} \right)$

2) Find $\lim_{x \rightarrow \infty} \left[-7(xe^{1/x} - x) \right]$

3) If $\lim_{x \rightarrow 0^+} (e^x + 4x)^{1/x} = e^k$, find k .

4) Find $\lim_{x \rightarrow 0} \frac{25x^3}{\tan^{-1}(5x^2)}$

5) $\lim_{x \rightarrow \infty} 2x \left[\ln x - \ln(x-3) \right]$

5-Digit Answer:

6) Consider the differential equation $\frac{dy}{dx} = x - y$. Let $y = f(x)$ be the particular solution to the differential

equation with initial condition $f(100) = 240$. Find $\lim_{x \rightarrow 100} \left(\pi \left[\frac{x^2 + [f(x)]^2 - 67600}{\tan\left(\frac{\pi x}{2}\right)} \right] \right)$.