DIGITLE – SAT/ACT
Puzzle 508 – Advanced Math Concepts

Directions: The first 5 problems have single digits 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:

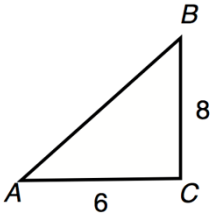
1) Find $\log_2 32 - \log_3 27$.

2) What is the positive value of x that satisfies this equation? $\begin{vmatrix} x & 12 \\ 3 & x \end{vmatrix} = 5x$

3) Hiram is training for a road race and wants to run 15 miles a week to get in shape. The first week he runs 5 miles and plans to add 0.5 miles each week until the goal is achieved. What is the minimum number of months need to achieve the goal? (assume 30 days in a month and the answer is an integer).

4) If $i = \sqrt{-1}$, find the value of $3i^3 + 5i^2 + i^{32} - 6i^6 - 3\left(i^2 - i - 1\right)$

5) In right triangle ABC shown to the right, find $5\dfrac{\sin A}{\tan A} + 1$.



5-Digit Answer:

6) $\dfrac{8+5i}{7+3i}$ is expressed in the form $\dfrac{a+bi}{c}$. Find the value of abc.