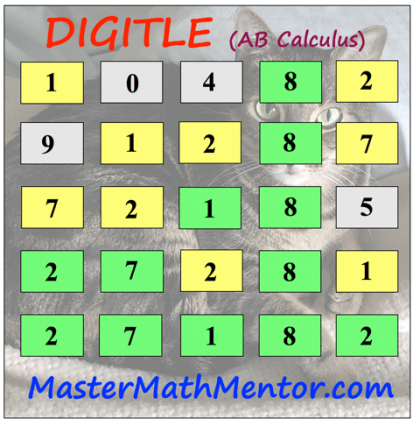
DIGITLE – SAT/ACT
Puzzle 509 – Linear / Exponential Growth



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) The company Pixto owns 250 pizza shops nationwide and plans to expand its stores by 5% over the number of the previous year's stores. To the nearest year, how many years are needed to have at least 300 stores.

2) A large fish tank is being drained. After 10 minutes, the tank has 400 gallons and after 30 minutes, there are 250 gallons remaining. Assuming that the water drains at a constant rate, to the nearest hour, how long will it take to drain the tank?

3) The mass of a radioactive isotope exponentially decays at the rate of 10% annually. If the initial amount if 500 grams, how many years will it take for the mass to be less than 200 grams?

4) A population of rabbits is modeled by $P(m) = 225 + 25m$ where m is measured in months. If the rabbit population is projected to be 1,725 in y years, what is the value of y ?

5) Ted has $1,800 to invest and wants to buy his wife a ring for $2,000. He plans to invest it at 4% compounded quarterly. To get that rate, he need to invest the money for a whole number of years. How many years are necessary for him to be able to purchase the ring?

5-Digit Answer:

6) A reservoir contains 7,592.5 gallons of water. The water department is working with the intake and outake valves. For 5 hours, the reservoir gains 5% of its water per hour in a linear fashion. For the next 5 hours, it loses 10% of its water per hour in an exponential fashion. And in the final 5 hours, it gains 20% of its water per hour in an exponential fashion. How much water will the reservoir have at the end of the 15 hours? (Use 4 decimal place accuracy in your calculations and round your final answer to the nearest gallon).