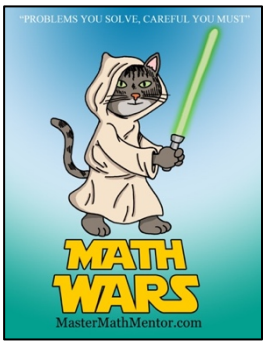
Math Wars – AB Calculus
Topic 137 – Growth and Decay



Maximum Time: 6 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=137

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.

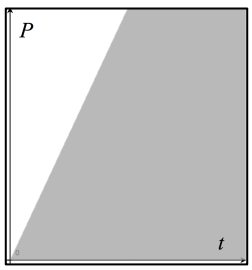
1. (1 pt) Choose the differential equation that models exponential growth.

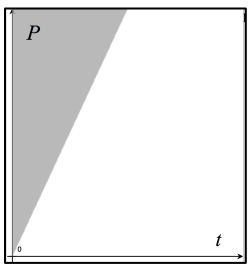
   A. The rate of change of y with respect to t *is* inversely proportional to t.
   B. The rate of change of y with respect to t *is* directly proportional to t
   C. The rate of change of y with respect to t is inversely proportional to y.
   D. The rate of change of y with respect to t is directly proportional to y.

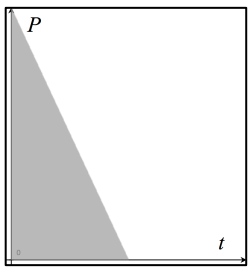
2. (3 pts) In a small city, 250,000 people have been vaccinated against COVID and this number is increasing continuously at the rate of 2.5% a week. Write a differential equation that describes this situation.

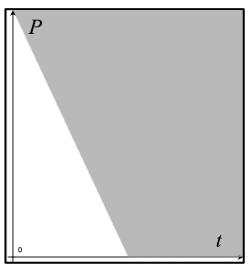
   A. $\frac{dV}{dt} = 0.025V$
   B. $\frac{dV}{dt} = 250000 + 0.025V$
   C. $\frac{dV}{dt} = 250000 + 0.025t$
   D. $\frac{dV}{dt} = 250000 - 0.975V$

3. (5 pts) The change in population P is inversely proportional to $P - 2t$ where the constant of proportionality is positive. Which of the shaded regions below describe when the population is decreasing.

   A. 

   B. 

   C. 

   D. 

4. (7 pts) A curve has the property that the slope of the curve at every point P is twice the square of the y-coordinate. The classification of the curve is

   A. quadratic B. logarithmic C. exponential D. reciprocal