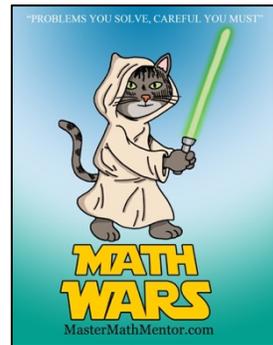# Math Wars – AB Calculus
Topic 113 – Straight-Line Motion

Maximum Time: 7.25 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=113

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) A particle is moving along the y-axis with position $y(t) = -6t^3 - t^2 + 10t - 4$. Describe the behavior of the particle at $t = 1$ second.

   A. Above the x-axis and speeding up
   C. Below the x-axis and speeding up

   B. Above the x-axis and slowing down
   D. Below the x-axis and slowing down

2. (3 pts) A particle is moving along the x-axis with position $x(t) = t + \dfrac{16}{t+1} + 4$ for 4 seconds. How many seconds is the particle moving left?

   A. 0 seconds   B. 1 second   C. 2 seconds   D. 3 seconds

3. (5 pts) A train is doing some switch operations in a yard. Its velocity in mph over 60 seconds is shown by the first graph while its position in feet relative to a platform is show in the second graph. How far does the train move over the 60 seconds?
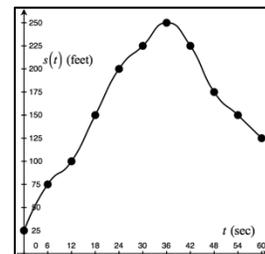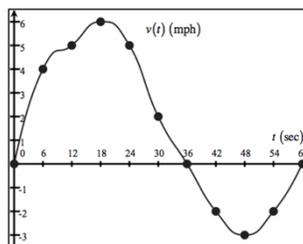
   A. 100 feet   B. 125 feet
   C. 325 feet   D. 350 feet

4. (7 pts) A bowling ball is dropped from a 200 ft tower onto a piece of bulletproof glass to see if the glass will shatter. How fast in mph is the bowling ball moving at impact?

   A. 38.57 mph   B. 56.57 mph   C. 77.14 mph   D. 113.14 mph

5. (9 pts) An enemy missile is flying horizontally at a maximum height 1,024 feet. A projectile is fired vertically to intercept it. What is its minimum initial velocity?

   A. $144\dfrac{\text{ft}}{\text{sec}}$ B. $256\dfrac{\text{ft}}{\text{sec}}$ C. $432\dfrac{\text{ft}}{\text{sec}}$ D. $512\dfrac{\text{ft}}{\text{sec}}$