

MT 1810 Calculus II
Course Activity I.7: Velocity and Distance Travelled

Name: _____

Purpose: To investigate how to calculate the distance travelled by an object if you know the velocity of that object.

Procedure: Work on the following activity with 1-2 other students during class (but be sure to complete your own copy) and finish the exploration outside of class.

1. Suppose on a recent car trip your velocity (in miles per hour) was given by the function $v(t) = -15t^4 + 96t^3 - 219.6t^2 + 211.2t$, where t is measured in hours. Your trip lasted from $t = 0$ to $t = 3$ hours. Estimate the total distance travelled by you on this trip. Use the following questions to help you with your estimate.
 - ✓ What simplifying assumption would help you make an approximation?
 - ✓ What are the units of $v(t)$? What are the units of distance travelled?
 - ✓ Can you improve on your current estimate? How?

5. A particle moving along a straight line has a velocity, $f(x)$ (in cm/sec), given by the following function:

$$f(x) = (-x^2 + 9x + 5) \cdot \sin x$$

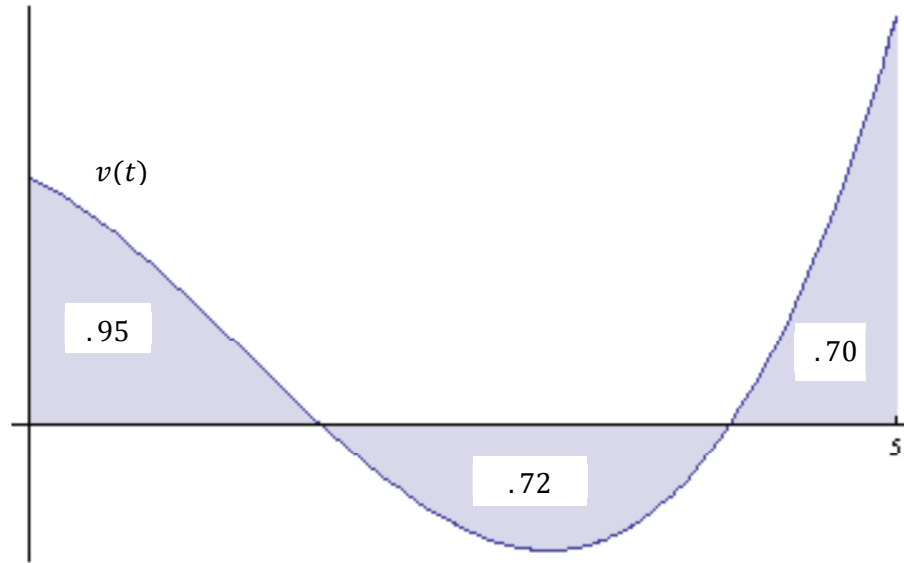
where x is measured in seconds.

- a. In total, how far does the particle travel between $x = 0$ and $x = 3$ seconds?

- b. In total, how far does the particle travel between $x = 0$ and $x = 5$ seconds?

- c. How far is the particle from where it started after $x = 5$ seconds?

6. The following graph shows the velocity, $v(t)$ (measured in miles per minute), of a car observed on a straight road from 0 to 5 minutes. The area between the curve and the x -axis in each segment is marked.



- a. After 5 minutes, how far was the car from its position at $t = 0$ minutes?
- b. Write a description of a scenario that would explain this velocity graph – extra points for the most entertaining story that is also correct!

Class Discussion: What Have We Learned/Recalled in this Activity?

Skills/Facts:

Methods:

Concepts to Understand:

