

### Mathematics 126, 5.5 Fourth

1. If the acceleration of an object is  $a(t) = 3t^2 - 5t$  m/sec, what is the net change in velocity over the interval  $[1, 5]$  seconds?

$$\begin{aligned} v(5) - v(1) &= \int_1^5 (3t^2 - 5t) dt \\ &= \left[ t^3 - \frac{5}{2}t^2 \right]_1^5 \\ &= 125 - \frac{125}{2} - \left( 1 - \frac{5}{2} \right) \\ &= \underline{64 \text{ m/s}} \end{aligned}$$

2. For the object in question 1, what is the displacement over the interval  $[1, 5]$  seconds if the initial velocity is 3 m/s? Does the initial position make a difference?

$$\begin{aligned} v(t) &= t^3 - \frac{5}{2}t^2 + 3 \\ s(5) - s(1) &= \int_1^5 \left( t^3 - \frac{5}{2}t^2 + 3 \right) dt \\ &= \left[ \frac{t^4}{4} - \frac{5t^3}{6} + 3t \right]_1^5 = \frac{194}{3} \text{ m} \end{aligned}$$

If the initial velocity is changed, we get a difference.

21 Understand the methods so you can solve similar problems.  
Understand the concepts so you can solve unfamiliar problems.



Study the (a) class notes, (b) text examples, (c) do the text exercises, (d) do the 4<sup>th</sup> hour problems and (e) read the next text section.