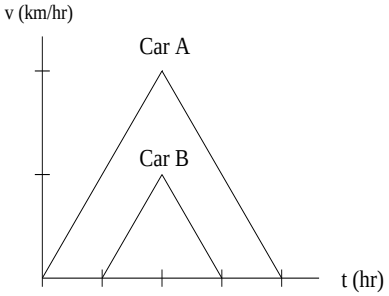
Section 5.1 and 5.2
Accumulated Change and the Definite Integral

1. Two cars travel in the same direction along a straight road. The figure below shows the velocity, v, of each car at time t. Car B starts 2 hours after car A and car B reaches a maximum velocity of 50 km/hr.



   a. For approximately how long does each car travel?

   b. Estimate car A's maximum velocity.

   c. Approximately how far does each car travel?

2. A student is speeding down I-85 (not any of you guys of course) in his fancy red Porsche when his radar system warns him of an obstacle 400 feet ahead. He immediately applies the brakes, starts to slow down, and spots a skunk in the road directly ahead of him. The "black box" in the Porsche records the car's speed every two seconds, producing the following table. The speed decreases throughout the 10 seconds it takes to stop, although not necessarily at a uniform rate.

Time since brakes applied (sec)	0	2	4	6	8	10
Speed (ft/sec)	100	80	50	25	10	0

   a. What is your best estimate of the total distance that the student's car traveled before coming to rest?

   b. Which one of the following statements can you justify from the information given?
      i. The car stoped before getting to the skunk.
      ii. The "black box" data is inconclusive. The skunk may or may not have been hit.
      iii. The skunk was hit by the car.

3. Use the following table to estimate $\int_3^4 W(t)dt$. What are n and Δt?

t	3.0	3.2	3.4	3.6	3.8	4.0
$W(t)$	25	23	20	15	9	2

4. a. Use your calculator to find $\int_0^6 (x^2+1)dx$. Represent this value as the area under a curve.

   b. Estimate $\int_0^6 (x^2+1)dx$ using a left-hand sum with $n = 3$. Reprsent this sum graphically on a sketch of $f(x) = x^2 + 1$. Is the sum an overestimate or underestimate of the true value found in part (a)?

   c. Estimate $\int_0^6 (x^2+1)dx$ using a right-hand sum with $n = 3$. Represent this sum graphically on a sketch of $f(x) = x^2 + 1$. Is the sum an overestimate or underestimate of the true value found in part (a)?