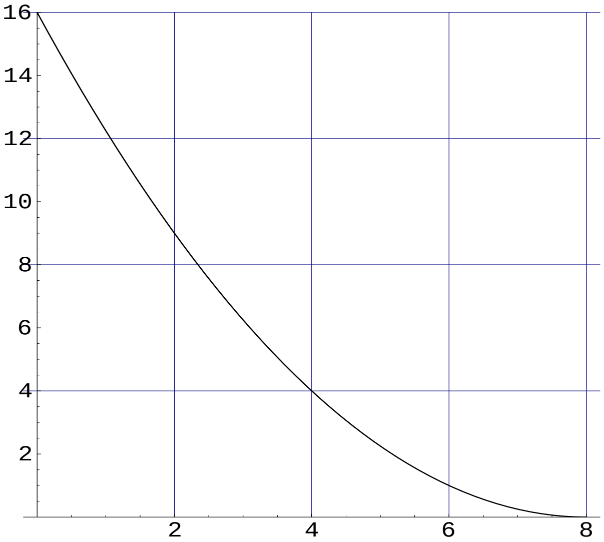
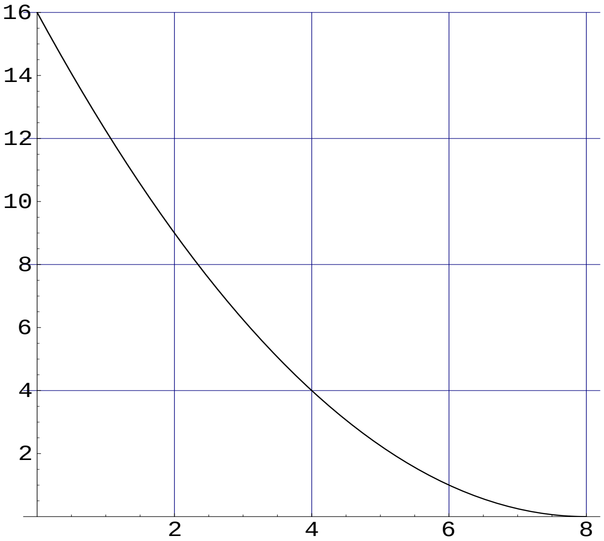
26L-04 Spring 1999
Lab Quiz 02.18.99 Name: ______________________________

1. (*10 points*) On each figure below, draw rectangles representing the corresponding Riemmann sums for the function f on the interval $0 \le t \le 8$. Calculate the (approximate) value of each sum.

(**a**) Left-hand sum with $\Delta t = 2$



(**b**) Right-hand sum with $\Delta t = 4$



turn over for more!

2. (*15 points*) Mick decides to run a marathon. Mick's friend Mack rides behind him on a bicycle and clocks his pace every 15 minutes. Mick starts out strong, but after an hour and a half he is so exhausted that he has to stop. The data Mack collected are summarized below:

Time spent running (min)	0	15	30	45	60	75	90
Speed (mph)	12	11	10	10	8	7	0

(**a**) Assuming that Mick's speed is never increasing, give upper and lower estimates for the distance Mick ran during the first half hour.

(**b**) Give upper and lower estimates for the distance Mick ran in total during the entire hour and a half.

(**c**) How often would Mack have needed to measure Mick's pace in order to find lower and upper estimates within 0.1 mile of the actual distance that he ran?