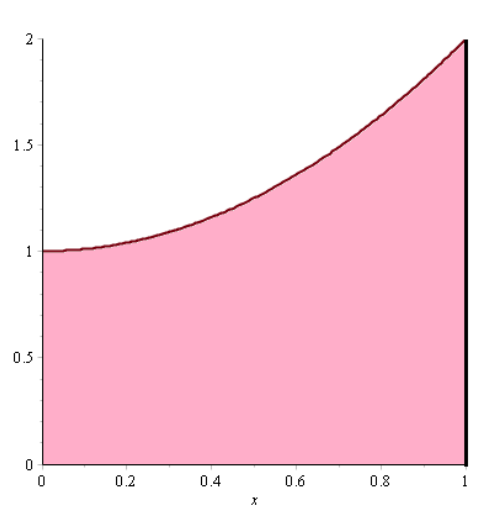
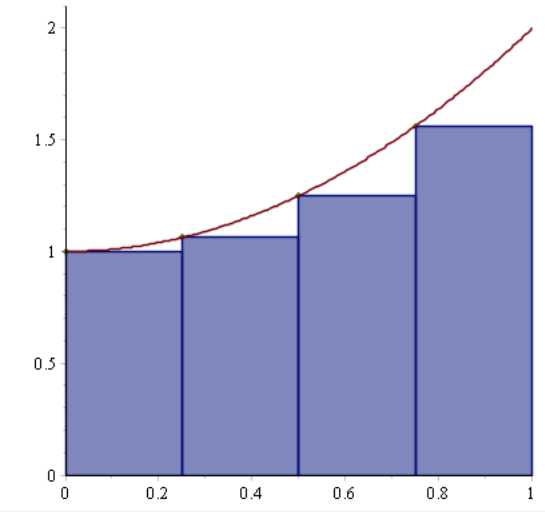
AREAS AND DISTANCE

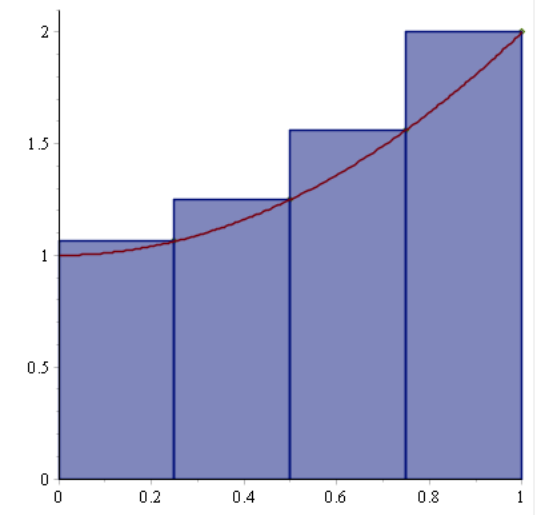
Lesson 4.1

PROBLEM

Consider the region bounded by the parabola $f(x) = x^2 + 1$, the x-axis, and the vertical lines $x = 0$ and $x = 1$. Let's estimate this area using simple objects: rectangles.







OBSERVATION

Approximate areas (both underestimates and overestimates) using *n* rectangles.

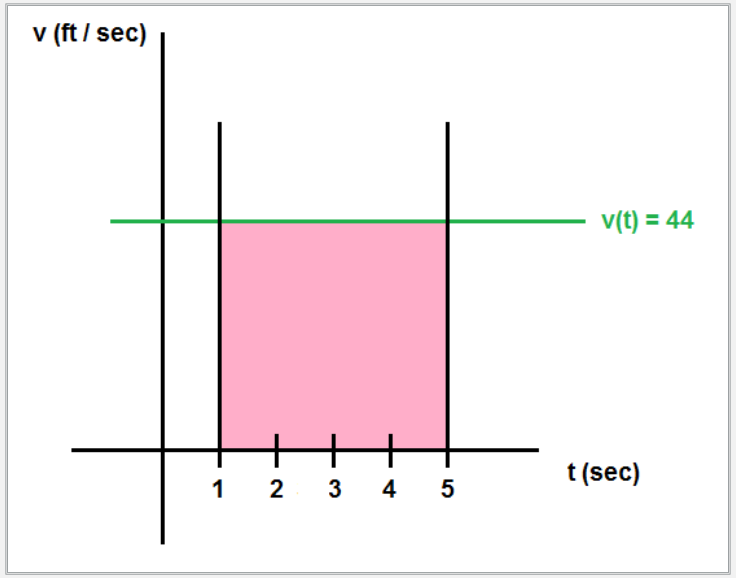
n	Lower Sum	Upper Sum
4	1.2188	1.4688
8	1.2734	1.3984
20	1.3088	1.3588
50	1.3234	1.3434
100	1.3284	1.3384
500	1.3323	1.3343

http://www.shodor.org/interactivate/activities/Integrate/

QUESTION

(a) Consider a car moving along a straight road with constant velocity $v(t) = 44$ ft/sec. What is the distance traveled by the car from $t = 1$ sec to $t = 5$ sec?

(b) What geometric calculation gives the answer (instantly!) to the above question? See the figure.



FOLLOW UP

Just a quick question: Would the same reasoning apply to a car with variable (nonconstant) velocity?