

6.1 #1

Monday, January 9, 2017 4:49 PM



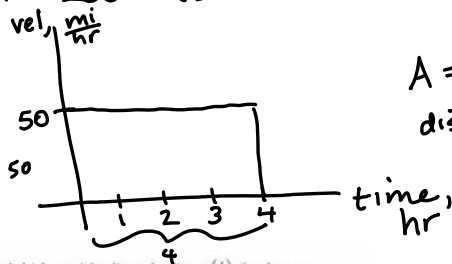
AP Calculus AB

6.1 Area as Net Change

A car travels at 50 mph for 4 hours. How far (how many miles) did the car travel?

$$d = r t$$

$$= 50 \frac{\text{mi}}{\text{hr}} \cdot 4 \text{ hr} = 200 \text{ miles}$$



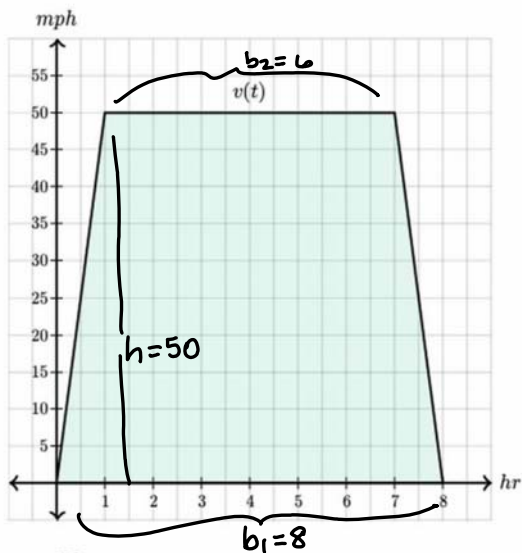
$$A = 4(50) = 200 \text{ mi}$$

dist = area under rate curve

1.

A freight train leaves a station on an eight-hour trip. Its velocity $v(t)$ is shown.

What is the total distance in miles that the train travels?



$$A = \text{hr} \cdot \frac{\text{mi}}{\text{hr}} = \text{miles}$$

$$A_{\text{TRAP}} = \frac{1}{2}(b_1 + b_2)h$$

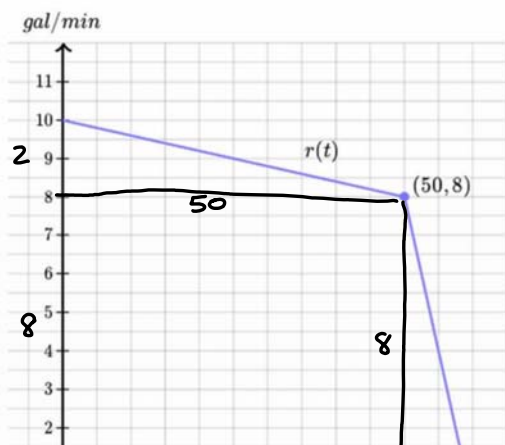
$$A = \frac{1}{2}(8+6)(50)$$

$$= 350 \text{ miles}$$

2.

It took 50 minutes before Joe Pepsi discovered that his bottling machine had sprung a major leak and cola was leaking all over the place. Mortified, Joe worked quickly and was able to stop the leak in 10 minutes. The rate at which cola leaked, in gallons per minute, is modeled by the piece-wise function $r(t)$ as shown.

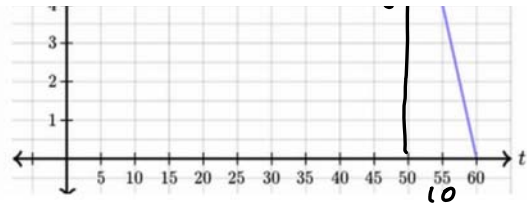
What was the total number of gallons of cola lost in the disaster?



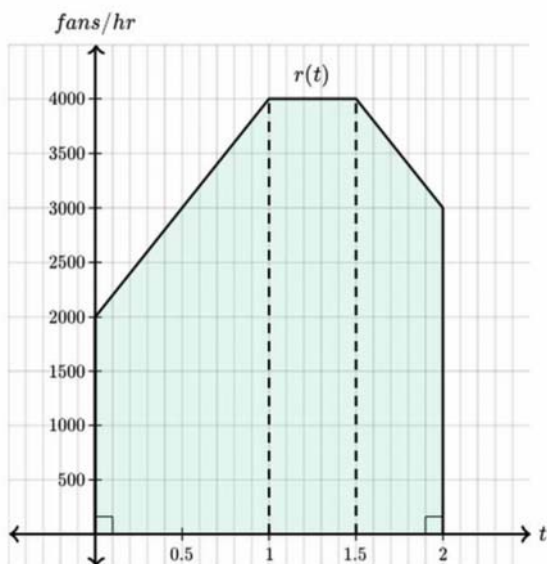
$$A = \text{min} \cdot \frac{\text{gal}}{\text{min}} = \text{gal}$$

$$A = 8(50) + \frac{1}{2}(2)(50) + \frac{1}{2}(8)(10)$$

$$= 490 \text{ gal}$$

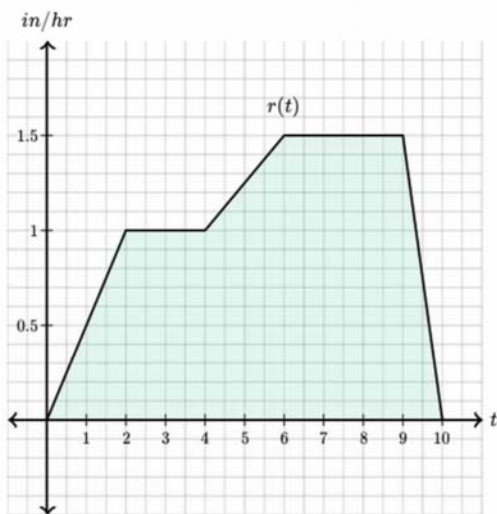


3. The doors to a college basketball arena opened two hours before game time. The rate at which fans entered the arena is shown in the graph below.



The total number of fans who entered the arena in the two hour period is .

4. A torrential rainstorm lasted 10 hours. The rate of rainfall in inches per hour is shown.



During the storm, the total rainfall was inches.

What if the rate function is not constant/linear?!



Problems 1-4 are from www.khanacademy.org

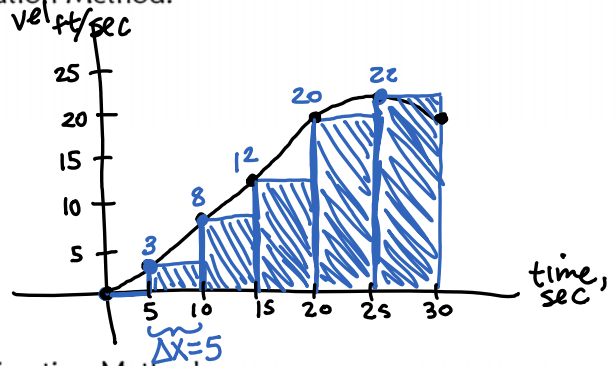
5. A runner's velocity is measured at 5 second intervals. To find the total distance she ran, use 6 rectangles to approximate the area under the velocity curve.

Time (sec)	0	5	10	15	20	25	30
Velocity (ft/sec)	0	3	8	12	20	22	20

a) LRAM: Use the LEFT Rectangular Approximation Method.

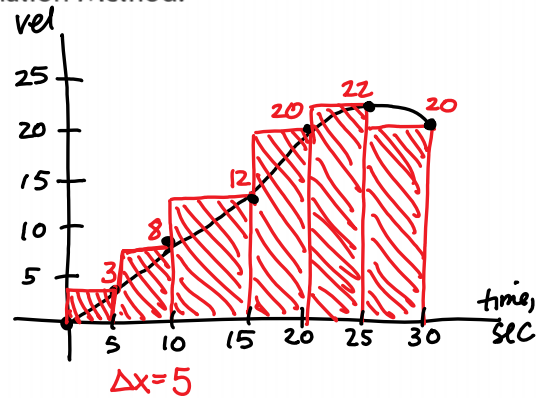
$$\Delta x = 5$$

$$\begin{aligned} A &= 5(0) + 5(3) + 5(8) \\ &\quad + 5(12) + 5(20) + 5(22) \\ &= 325 \text{ feet} \end{aligned}$$



b) RRAM: Use the RIGHT Rectangular Approximation Method.

$$\begin{aligned} A &= 5(3) + 5(8) + 5(12) + 5(20) \\ &\quad + 5(22) + 5(20) \\ &= 425 \text{ feet} \end{aligned}$$



c) MRAM: Why can't you use MRAM?

(midpoint) → can't assume midpoints from a table