

6.1B Notes

Wednesday, October 31, 2018 8:14 AM

6.1 Notes

Estimating Area Under a Curve – Using a Table

The velocity of an object is given in the table below.

Time (sec.)	Velocity (m/sec)
0	0
20	44
30	15
50	35
70	30
80	44
120	35

Estimate the distance travelled by the object in the first two minutes of movement using LRAM and RRAM. (How many partitions should we use?)

$$\begin{aligned} \text{LRAM}_6 &= 20(0) + 10(44) + 20(15) + 20(35) + 10(30) + 40(44) \\ &= \boxed{3500\text{m}} \end{aligned}$$

$$\begin{aligned} \text{RRAM}_6 &= 20(44) + 10(15) + 20(35) + 20(30) + 10(44) + 40(35) \\ &= \boxed{4170\text{m}} \end{aligned}$$

A power plant generates electricity by burning oil. Pollutants produced by the burning process are removed by scrubbers in the smokestacks. Over time the scrubbers become less efficient and eventually must be replaced when the amount of pollutants released exceeds government standards. Measurements taken at the end of each month determine the rate at which pollutants are released in the atmosphere as recorded in the table below. *Assume on Jan 1st rate = 0*

Month (days in month)	January (31 days)	February (28 days)	March (31 days)	April (30 days)	May (31 days)	June (30 days)
Pollutant release rate (tons/day)	0.20	0.25	0.27	0.34	0.45	0.52
Month (days in month)	July (31 days)	August (31 days)	September (30 days)	October (31 days)	November (30 days)	December (31 days)
Pollutant release rate (tons/day)	0.63	0.70	0.81	0.85	0.89	0.95

Give an upper estimate and a lower estimate of the total tonnage of pollutants released into the air by the end of December.

$$\text{Upper: } RRAM_{12} = 31(0.20) + 28(0.25) + \dots$$

$$= \boxed{209.35 \text{ tons}}$$

$$\text{Lower: } LRAM_{12} = 31(0) + 28(0.2) + 31(0.25) + 30(0.27) + 31(0.34) + 30(0.45)$$

$$+ 31(0.52) + 31(0.63) + 30(0.70) + 31(0.81) + 30(0.85) + 31(0.89)$$

$$= \boxed{180.34 \text{ tons}}$$

In the best case scenario, approximately when will a total of 125 tons of pollutants have been released into the air?

Sometime in October