5-5 Integral Applicaons

Learning Objecves:

I can use integraon to solve real world problems.

I can use integraon to calculate displacement and total distance traveled.

Nov 26-11:11 AM

Ex1. Water is entering/exing a tank. r(t) represents the rate at which water is entering/exing the tank at me t.

t	r(t)
0	2
1	7
5	10
8	3
10	-2
18	5

a.) Approximate $\int_0^{18} r(t)dt$ using a right rectangle approximaon method

92 ft³

b.) Explain the meaning of this integral using proper units.

change in volume (cubic feet) from time (t)=0 minutes to 18 minutes.

c.) Find the rate of change in the depth of the water with respect to me when t=5 min. Indicate the of measure. Assume that the tank is a rectangular box that is 5 by 10 by 4.

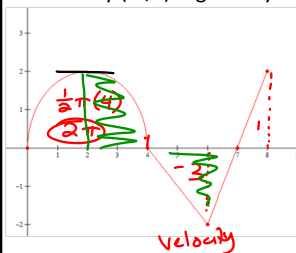$\frac{dh}{dt} = ?$

$\frac{dV}{dt} = 10$

$V = \ell wh$

$V = 50h$

$\frac{dV}{dt} = 50 \frac{dh}{dt}$

$10 = 50 \frac{dh}{dt}$

$\frac{dh}{dt} = \frac{1}{5}$ ft/min

Nov 26-11:11 AM

Ex2. An object is moving back and forth on the number line. Its velocity (m/s) is given by the graph below.

Velocity

a.) Find $\int_0^8 v(t)dt$

$2\pi - 2$ meters

Explain the meaning of this integral using appropriate units.

change in position (meters) from 0 to 8 seconds

b.) Find the total distance traveled by the object from t=2 sec to me t=7 sec.

$\pi + 3$ meters

c.) Find the acceleraon of the object at me t=2 sec and at me t=7 sec.

0 m/sec²

2 m/sec²

Nov 26-11:11 AM

Homework
pg 312 # 9-12, 31-36

Nov 26-11:11 AM

1