1. $v(t) = \sin t \quad [0, 3\pi]$

7.1 The Integral as a Net Change

The area under a rate of change is ______________________________

For #1 – 3, the velocity of a particle moving along a line over an interval is given (in m/s). Find each of the following.

a) When is the particle moving to the left, right and stopped?

b) Find the displacement.

c) If m, find the final position.

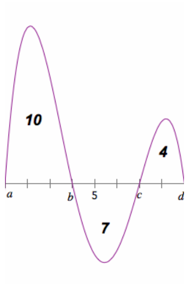
d. Find the total distance traveled by the particle.

2. $v(t) = \cos 2t \quad [0, 2\pi]$

3. $y = -x^2 + 4x - 3 \quad [0, 5]$

7.1

4. The graph of v(t) is given in ft/s. The numbers indicate the area of each region and s(0)=5. Find each of the following.



a) The displacement over [a,d]

b) The total distance traveled over [a,d]

c) The position at b,c, and d.

d) Approximately when is the acceleration the greatest? Least? Zero?

e) When is the particle speeding up? Slowing down?

5. The rate at which your home consumes electricity is measured in kilowatts. If your home consumes electricity at the rate of one kilowatt for 1 hour, you will be charged for 1 "kilowatt-hour" of electricity. Suppose that the average consumption rate for a certain home is modeled by the function $C(t) = 3.9 - 2.4\sin\left(\frac{\pi t}{12}\right)$

where C(t) is measured in kilowatts and t is the number of hours past midnight. Find the average daily consumption for this home, measured in kilowatt-hours.

6. Hanksopolis's population density decreases as you move away from the city center and is given by the function $D(r) = 5000(3-r)$ at a distance r miles from the city center.

A) If the population reaches zero at the edge of the city, what is the city's radius?

B) Estimate the total population of Hanksopolis.

7. A pump connected to a generator operates at a varying rate. The rate at which the pump operates is recorded at 5-minute intervals for one hour. How many gallons were pumped during that hour?

Table 7.1 Pumping Rates

Time (min)	Rate (gal/min)
0	58
5	60
10	65
15	64
20	58
25	57
30	55
35	55
40	59
45	60
50	60
55	63
60	63

7.1