Name_____ AP Calculus
Block_____ Date_____ Activity(Integrals) 40 pts
Calculator OK

Verbal:

2006 AP Calculus Free Response (2)
At an intersection in Thomasville, Oregon, cars turn left at the rate $L(t) = 60\sqrt{t}\,\sin^2\left(\frac{t}{3}\right)$ cars per hour over the time interval $0 \le t \le 18$ hours.

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Graph:

The graph of $y = L(t)$ is shown below.

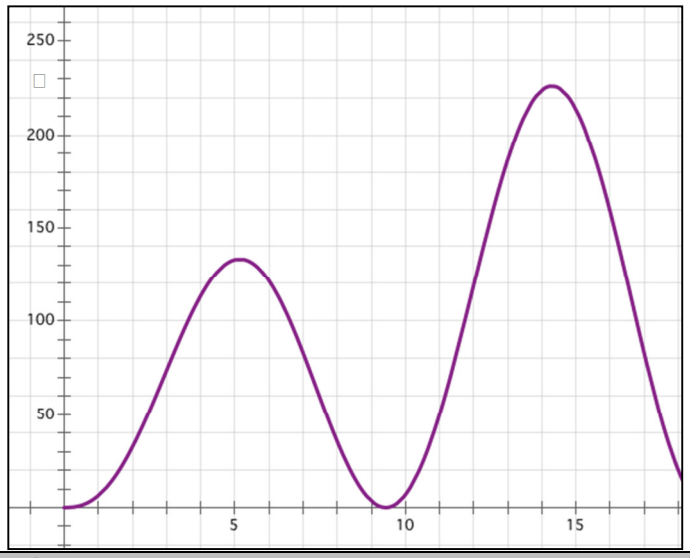

Table:

Using technology construct a table for the function.

t	$y = L(t)$
0	0.000
1	6.423
2	32.446
3	73.585
4	113.360
5	132.935
6	121.517
7	83.000
8	35.485
9	3.585
10	6.891
11	50.004
12	119.044
13	186.710
14	224.030
15	213.681
16	158.761
17	82.705
18	19.874

Analysis:

1. To the nearest whole number, find the total number of cars turning left at the intersection over the time interval $0 \le t \le 18$ hours.

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2. Traffic engineers will consider turn restrictions when $L(t) \ge 150$ cars per hour.

a. Find all values of t for which $L(t) \ge 150$. Describe 2 ways to do this on a graphing calculator.

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b. Compute the average value of L over this interval. Indicate units of measure.

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