

Stoplight Activity - Elementary Statistics Version 3

Prepare a word-processed report detailing your solutions and logic to address the following problem. Place the report in your portfolio. It counts the weight of four regular portfolio entries, so prepare accordingly.

Several years ago, the stoplight at the intersection of Highway 292 and Highway 176 had been malfunctioning for approximately four years. During the "drive home" hours from 4:30 -6:30 p.m. on weekdays, most Highway 176 traffic was westbound. The eastbound left turn signal had a malfunctioning sensor that directed the light to produce a left turn arrow even when no left turning vehicles were present. Westbound vehicles had to wait for the malfunctioning light before proceeding. The duration of the wait was about eleven seconds for each cycle of the traffic light. The total cycle from the time the westbound light turned green until it returned to green averaged 105 seconds. On 25 occasions during the "drive home" hours, a statistics professor and his students witnessed westbound vehicles waiting needlessly at this light. The following data set lists the number of vehicles involved on each observation:

9	8	12	11	8
6	7	9	1	10
7	6	6	4	8
11	5	6	5	10
9	6	9	6	8

- (a) Produce a 95% confidence interval for the number of cars waiting needlessly during one cycle.
- (b) Use the results of (a) to estimate the number of vehicles affected between 4:30 and 6:30 on a typical weekday. Your answer will, of course, be an interval estimate.
- (c) Assume each vehicle carries, on average, two people. Give an interval estimate of the accumulated person-hours lost to this malfunctioning light during the "drive home" hours on weekdays over the four-year period. Explain all your assumptions in a paragraph or two.
- (d) The federal minimum wage is \$6.55 per hour. At this rate, what is the total economic value lost to this light during "drive-home" over the four years the light malfunctioned? Give minimum and maximum estimates.