

STAT 509 2017 Summer HW7

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Lecture Day: May 17

1. In 1990 the lead concentration in gasoline ranged from 0.1 to 0.5 grams/liter. Let Y = grams per liter of lead in gasoline. The probability density function for Y is

$$f(y) = 12.5y - 1.25, \text{ for } 0.1 < y < 0.5.$$

- (a) What is the probability that a random liter of gasoline would contain between 0.1 and 0.4 grams/liter of lead?
 - (b) What is the probability that a random liter of gasoline will contain more than 0.3 grams/liter of lead?
 - (c) Give the cumulative probability function $F_Y(y)$ (*Hint: you need to discuss the value of y for three cases: $y \leq 0.1$, $0.1 < y < 0.5$, and $y \geq 0.5$.*).
 - (d) Use the cumulative probability function $F_Y(y)$ to calculate the probability that a random liter of gasoline will contain less than 0.35 grams of lead.
 - (e) Calculate the expected value of Y .
 - (f) Calculate the variance for Y .
2. Suppose the weight, say, Y , in pounds of a certain packaged chemical is uniform from 48 to 50 pounds. That is the pdf is of the form

$$f_Y(y) = \frac{1}{2}, \text{ for } 48 \leq y \leq 50.$$

- (a) What is the mean weight of the chemical?
- (b) What is the probability that a randomly chosen package of chemical will weigh between 48.5 and 49.4 pounds?
- (c) In the long run, what proportion of packages will weigh more than 49.2 pounds?