

STA2001 Tutorial 5

1. 3.1-15. The life X (in years) of a voltage regulator of a car has the pdf

$$f(x) = \frac{3x^2}{7^3} e^{-(x/7)^3}, \quad 0 < x < \infty$$

- (a) What is the probability that this regulator will last at least 7 years?
- (b) Given that it has lasted at least 7 years, what is the conditional probability that it will last at least another 3.5 years?

2. 3.1-17. An insurance agent receives a bonus if the loss ratio L on his business is less than 0.5, where L is the total losses (say, X) divided by the total premiums (say, T). The bonus equals $(0.5 - L)(T/30)$ if $L < 0.5$ and equals zero otherwise. If X (in \$100,000) has the pdf

$$f(x) = \frac{3}{x^4}, \quad x > 1,$$

and if T (in \$100,000) equals 3, determine the expected value of the bonus.

3. Buses arrive at a specified stop at 15-minute intervals starting of 7 A.M. That is, they arrive at 7, 7:15, 7:30, 7:45. If a passenger arrives at the stop at a time that is uniformly distributed between 7:00 and 7:30, find the probability that he waits
- (a) less than 5 minutes for a bus;
 - (b) more than 10 minutes for a bus.

4. 3.2-6. A certain type of aluminum screen 2 feet in width has, on the average, three flaws in a 100-foot roll.
- (a) What is the probability that the first 40 feet in a roll contain no flaws?
 - (b) What assumption did you make to solve part (a)?