

Econ 311: Problem Set #4

Due: Monday, November 3, 2008

Q.1 (Uniform Distribution) A repair team is responsible for a stretch of oil pipeline 4 miles long. The distance (in mile) at which any fracture occurs can be represented by a uniformly distributed random variable, with probability density function

$$f(x) = 0.25$$

Find the cumulative function and the probability that any given fracture occurs between 1 mile and 2 miles along the stretch of pipeline.

Q.2 The profit for a production process are equal to \$2,000 minus 2 times the number of units produced. The mean and variance for the number of units produced are 500 and 900 respectively. Find the mean and variance of the profit.

Q.3 Let the random variable X follow a normal distribution with $\mu = 50$ and $\sigma^2 = 64$.

- a Find the probability that X is greater than 60.
- b Find the probability that X is greater than 35 and less than 62.
- c Find the probability that X is less than 55.
- d The probability is 0.2 that X is greater than what number?
- e The probability is 0.05 that X is in the symmetric interval about the mean between which two numbers?

Q.4 (Normal Probability) A client has an investment portfolio whose mean value is equal to \$500, with a standard deviation of \$15. She has asked you to determine the probability that the value of her portfolio is between \$485 and \$530.

Q.5(Exponential Probabilities) An industrial plant in Britain with 1000 employees has a mean number of lost time accidents per week equal to $\lambda = 0.8$, and the number of accidents follows Poisson distribution. What is the probability that the time between accidents is less than 2 weeks?