Math 153 - Quiz 9
November 10, 2016

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (8 points) A company supplies gasoline filters for the automotive industry. One type of filter has an average life of 35,000 miles with a standard deviation of 4,000 miles. It has been found that the filter lives are normally distributed.

   (a) About what percent of these filters should last more than 30,000 miles?

   $P(x > 30000) = \text{normalcdf}(30000, 9999999, 35000, 4000)$

   ≈ 0.8944 → 89.44 %

   (b) If a filter is selected at random, what is the probability that it will last between 28,000 and 37,000 miles?

   $P(28000 \le x \le 37000) = \text{normalcdf}(28000, 37000, 35000, 4000)$

   $\approx$ 0.6514

   (c) In a sample of 10 filters, about how many should last exactly 35,000 miles?

   None will last exactly 35000 miles.

   (d) The company will replace a used filter for free if its life doesn't exceed the 15th percentile. What number of miles is at that cutoff?

   $\text{invNorm}(0.15, 35000, 4000)$

   $\approx$ 30,854.3 mi

2. (2 points) Suppose that at a certain automobile plant the average number of work stoppages per day is 12.0. On any given day, what is the probability of having 15 or fewer work stoppages?

   Poisson
   $\mu = 12.0$

   $P(x \le 15) = \text{poissoncdf}(12.0, 15)$

   $\approx$ 0.8444

3. (2 points extra credit) The problem above involves a Poisson process. Use the values of μ and σ associated with that process, and treat the numbers of work stoppages as being normally distributed. Compute $P(x \leq 15)$ and compare it to your answer above.

$\mu = 12$

$\sigma = \sqrt{12}$

$P(X \leq 15) \approx \text{normalcdf}(-999999, 15, 12, \sqrt{12})$

≈ 0.8068

THIS IS CLOSE TO THE PROB IN #2.

PERHAPS THE POISSON DIST IS CLOSE TO NORMAL.