Learning Journal Unit 6

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MATH 1280: Introduction to Statistics

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We are given the random variable X that follow an exponential distribution such

as: $X \sim Exp\left(\frac{1}{9.848}\right)$

1. Find the expected value

$$\mu = \frac{1}{m}$$

$$\mu = \frac{1}{\left(\frac{1}{9.848}\right)} = 9.848$$

2. Find the standard deviation

$$\mu = \sigma = 9.848$$

3. Find $P(X < 12)$

$$P(x > 12) = 1 - P(x < 12)$$

Since $P(X < x) = 1 - e^{-mx}$, then $P(X > x) = 1 - (1 - e^{-mx}) = e^{-mx}$

$$e^{-mx} = e^{-(1/9.848)*12} \approx 0.2957$$

Therefore, the probability that x is more than 12 is 0.2957.

4. Find $P(8 < X < 14)$

$$P(8 < x < 14) = P(x < 8) - P(x < 14)$$

$$P(X < 8) = 1 - e^{-mx} = 1 - e^{-(1/9.848)*8} \approx 0.5562$$

$$P(X < 14) = 1 - e^{-mx} = 1 - e^{-(1/9.848)*14} \approx 0.7587$$

$$P(x < 8) - P(x < 14) = 0.7587 - 0.5562 = 0.2025$$

Therefore, the probability that x lies between eight and fourteen is 0.2025.