

Answer on Question #46066 - Math - Statistics and Probability

The sales per day in a shop is exponentially distributed with average sale amounting to Rs.100 and net profit is 8%. Find the probability that the net profit exceeds Rs.30 on two consecutive days.

Solution

The exponential probability distribution function is given by the formula $\lambda e^{-\lambda x}$, the mean of the distribution is $\frac{1}{\lambda}$.

As the mean is 100, $\lambda = 0.01$.

Net profit is 8%, so, if net profit equals to 30, then sales are equal to $30/0.08=375$.

Thus, to find the probability that net profit exceeds 30, we should find the probability that sales are greater than 375.

$$P(X > 375) = 1 - P(X \leq 375)$$

Use R to calculate the probability using exponential distribution.

R code:

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1 - pexp(375, rate=1/100)
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The value is 0.023518. This is the probability that net profit exceeds 30 in one day.

To calculate the probability that net profit exceeds 30 on two consecutive days, multiplicate probabilities:

$$0.023518 * 0.023518 = 0.000553$$