

STUDENT INFO

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Answer 1)

A)

$$N \geq 0.25 * (z_{0.005}/e)^2$$

$$N \geq 0.25 * (z_{0.005}/0.02)^2$$

$$N \geq 0.25 * (-2.5758/0.02)^2$$

$$N \geq 4146.7$$

Therefore, we choose N as 4147

B)

Expected value for gamma distribution is a / λ so the expected value for the weight of an auto is $190/0.15 = 1266.67$

We use the same formula for the weight of a truck $110/0.01 = 11000$

Expected value for the total weights of all automobiles that pass over the bridge on a day is $50 * 1266.67 = 63333.33333$

expected value for the total weights of all trucks that pass over the bridge on a day is $11000 * 10 = 110000$

Answer 2)

Firstly, we find the N value shown in answer 1. Then we need to generate sample for truck count and car count. Then, we use those counts to calculate weights of trucks and autos by using $(\text{sum}(-1/\alpha * \log(\text{rand}(\lambda, j))))$; formula. After that, we sum the autos and trucks weights and put it in a list for every trial. Then, we find the mean of that list to find estimation of the total weight and we use $\text{mean}(\text{TotalWeight} > 200000)$; formula to find probability that the total weight of all the vehicles that pass over the bridge on a day. And finally we use $\text{std}(\text{TotalWeight})$; to find standard deviation.

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probability that the total weight of all the vehicles that pass over the bridge on a day = 0.215336  
Estimation of the total weight = 173110.838637  
Std(X) = 35211.169761
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