Student Information

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Answer 1

a)

The size of the monte carlo study should be determined by that formula:

$$N \geq 0.25 * (\frac{Z_{\alpha/2}}{\epsilon})^2$$

We know that$\epsilon = 0.02$
To calculate the Z value. For 0.99 level of confidence we should take $1 - \alpha = 0.99$
So $\alpha/2$ would be 0.005. So we should look at the value 0.995 which is between 2.57 and 2.58. Then we should take $Z_{\alpha/2} = 2.575$.
Then if we calculate we get:

$$N \geq 4144,14$$

$$N = 4145$$

b)

(*) The expected value of gamma distribution is $\frac{\alpha}{\lambda} = \frac{190}{0.15} = 1267$
(**) The expected value of gamma distribution is $\frac{\alpha}{\lambda} = \frac{110}{0.01} = 11000$
(***) Expected value of total weight is average weight multiplied by Expected value of automobiles passing the bridge in a day. Which is equal to λ. So the answer would be 50*1267=63350
(****) Expected value of total weight is average weight multiplied by Expected value of trucks passing the bridge in a day. Which is equal to λ. So the answer would be 10*11000=110000

Answer 2

This is the output of my code:

```
Estimated probability = 0.212304
Expected weight = 173171.788240
Standard deviation = 35836.463137
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My comment about the standard deviation is when it is added to the mean it becomes larger than 200000. So there is a probability that the bridge may collapse. Moreover 35836/11000 is near 3. And 35836/1267 is near 28. So we can say that the mean of the difference that the trucks has passed over the bridge and the estimated number of trucks is near 3. And the mean of the difference that the automobiles has passed over the bridge and the estimated number of automobiles is near 28.