1.

1)E(X) = 1/5(E(X1)+ E(X2)+ E(X3)+ E(X4)+ E(X5)) = 3

SD(X) = (1/25\*SD(X1)2+1/25\*SD(X2)2+1/25\*SD(X3)2+1/25\*SD(X4)2+1/25\*SD(X5)2)^(1/2) = 1.3416

2)It is not possible to find the actual distribution and the n = 5 is too small to follow the normal distribution. It would not be a good estimate.

2.

P = 3.971503e-07

Consider the experiment in a total way. Y is the average of the purine amount. Which means the total amount of purine is greater or equal to 1500 in 2000 total experiment times. So it is p = 0.7 and size = 2000 while the set\_x is from 1500 to 2000

3.

P=0.9623641 0.9623659

Every time we generate 50 samples and we calculate the mean value of X and Y. if mean X+0.5 < the mean of Y. Then we give the success count add 1. Each time we will run 10000 times to calculate the possibility. Then we repeat this for 20 time and calculate the 95% CI value.

4.

Mean value of 95% CI: 17.99271-18.22723

Var of 95% CI: 13579.09 58736.27

First generate x1, x2, x3 using R built in function to generate 1000 rows sample, each row with 100000 sample. Then use them to calculate y. Then just calculate the mean and SD value with 95% CI. It looks like the var value is really big considering the sample size. It is mostly contribute by x3^2. Although t distribution has a mean of 0 but square of it is not.