

Problem 3: Fill in the information below based on your data which were generated using your ID number as the seed for the random number generator.

$\mu = 3$

$\sigma = 5$

The first ten 95% confidence intervals for μ are:

[,1] [,2]

[1,] 0.70245196 4.134330

[2,] 0.80785124 4.267399

[3,] 0.86460657 4.531631

[4,] 1.40522116 5.012024

[5,] 0.74519196 4.588979

[6,] 1.32233670 5.542785

[7,] 1.19248103 4.470778

[8,] -0.07364781 3.848749

[9,] 1.00981369 4.952529

[10,] 1.42122798 5.152240

The proportion of 95% confidence intervals which contain the true value of μ = 0.9528

What factors affect how close this proportion is to 0.95? Under what circumstances might you expect this proportion to be close to 0.95, and under what circumstances would you expect this proportion to be not as close to 0.95?

A number of experiments will affect this proportion. If a number of experiments is large, each time a 95% confidence interval for θ is constructed using data, then approximately 95% of these constructed intervals would contain the true θ . If a number of experiments is small, it will affect this proportion to be not as close to 0.95 and vice versa. In this case, $\theta = 0.9528$ is close to 0.95

The first ten 95% confidence intervals for σ are:

[,1] [,2]

[1,] 3.245929 5.783065

[2,] 3.272100 5.829692

[3,] 3.468335 6.179311

[4,] 3.411376 6.077832

[5,] 3.635521 6.477175

[6,] 3.991773 7.111887

[7,] 3.100670 5.524266

[8,] 3.709871 6.609640

[9,] 3.729088 6.643879

[10,] 3.528856 6.287138

The proportion of 95% confidence intervals which contain the true value of $\sigma = 0.9438$

What factors affect how close this proportion is to 0.95? Under what circumstances might you expect this proportion to be close to 0.95, and under what circumstances would you expect this proportion to be not as close to 0.95?

A number of experiments will affect this proportion. If a number of experiments is large, each time a 95% confidence interval for θ is constructed using data, then approximately 95% of these constructed intervals would contain the true θ . If a number of experiments is small, it will affect this proportion to be not as close to 0.95 and vice versa. In this case, $\theta = 0.9438$ is close to 0.95