Stats /

Comparing confidence intervals for the population mean when the population...

	$\bar{x}$	75% lower limit	75% upper limit	95% lower limit	95% upper limit
S1	80.1	78.8	81.4	77.8	82.4
S2	79.3	78.0	80.6	77.0	81.6
S3	80.5	79.2	81.8	78.2	82.8
S4	81.8	80.5	83.1	79.5	84.1
S5	81.1	79.8	82.4	78.8	83.4
S6	79.8	78.5	81.1	77.5	82.1
S7	79.7	78.4	81.0	77.4	82.0
S8	78.3	77.0	79.6	76.0	80.6
S9	80.8	79.5	82.1	78.5	83.1
S10	80.1	78.8	81.4	77.8	82.4
S11	78.1	76.8	79.4	75.8	80.4
S12	80.9	79.6	82.2	78.6	83.2
S13	80.8	79.5	82.1	78.5	83.1
S14	79.7	78.4	81.0	77.4	82.0
S15	82.6	81.3	83.9	80.3	84.9
S16	81.0	79.7	82.3	78.7	83.3
S17	80.6	79.3	81.9	78.3	82.9
S18	79.8	78.5	81.1	77.5	82.1
S19	79.1	77.8	80.4	76.8	81.4
S20	80.2	78.9	81.5	77.9	82.5

(a) How many of the 75% confidence intervals constructed from the 20 samples contain the population mean, μ = 80? **16**

count all the ones under 75% that hit the red line

(b) How many of the 95% confidence intervals constructed from the 20 samples contain the population mean, μ = 80? **19**

count all the ones under 90% that hit the red line

(c) Choose ALL that are true.

☑ There is nothing wrong with the fact that the 95% confidence intervals are different from each other. Each confidence interval depends on its sample, and different samples may give different confidence intervals.

Each sample is different data, they should all be different

☑ The center of the 75% confidence interval for Sample 1 is 80.1, because the center of a confidence interval for the population mean must be the sample mean.

Yes the center is the same for BOTH CI

☐ It is surprising that some 75% confidence intervals are different from other 75% confidence intervals. They should all be the same, as long as the samples are random samples from the same population.

No, they are all different (see a)

☑ We would expect to find more 95% confidence intervals that contain the population mean than 75% confidence intervals that contain the population mean. Given a sample, a higher confidence level results in a wider interval.

Yes the higher the CI the wider the CI the more it will contain

☐ None of the choices above are true.

Note: The Solve feature is not available to students.

More Explanations for C:

- ○ The HIGHER the confidence interval is the WIDER it is and the more likely the population mean will fall within that range.
  - ○ Below is an example and my explanation of them:
    - For some of the samples, the 75% confidence interval is included in the 90% confidence interval, while for other samples, this is not the case.
      - *This is NOT true. Both CI are based on the same samples, so ALL of the 75% CI would fit inside of the 90% CI*
    - We would expect to find more 90% confidence intervals that contain the population mean than 75% confidence intervals that contain the population mean. Given a sample, a higher confidence level results in a wider interval.
      - *This is TRUE. 90% is bigger than 87% so the 90% CI is wider and it will contain the population mean more often.*
    - It is surprising that some 75% confidence intervals are different from other 75% confidence intervals. They should all be the same, as long as the samples are random samples from the same population.
      - *This is NOT true. Every sample is different so of course you will have different numbers for each sample.*
    - Since Sample 19 and Sample 20 are drawn from the same population, the center of the 90% confidence interval for Sample 19 must be the same as the center of the 90% confidence interval for Sample 20.
      - *This is NOT true. They are drawn from the same population. BUT they are not the same SAMPLE. So they will not be the same.*