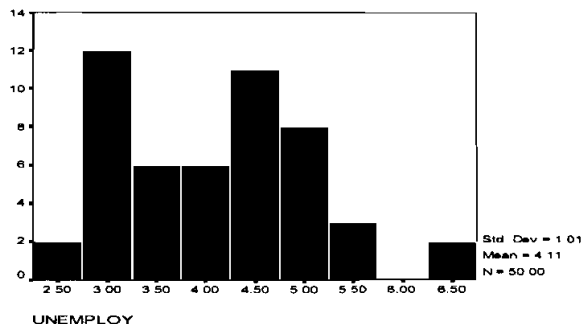


Name: Key

2000 Census United States unemployment rate: 4.11%

- | | | |
|---------------------------|---------------------------|--------------------------|
| 1. West Virginia - 6.6% | 21. Nevada - 4.4% | 41. Kansas - 3.0% |
| 2. Alaska - 6.4% | 22. Pennsylvania - 4.4% | 42. Vermont - 3.0% |
| 3. Oregon - 5.7% | 23. Illinois - 4.3% | 43. Wisconsin - 3.0% |
| 4. Hawaii - 5.6% | 24. Ohio - 4.3% | 44. Colorado - 2.9% |
| 5. New Mexico - 5.6% | 25. Maine - 4.1% | 45. Nebraska - 2.9% |
| 6. California - 5.2% | 26. Rhode Island - 4.1% | 46. South Dakota - 2.9% |
| 7. Idaho - 5.2% | 27. Georgia - 4.0% | 47. Minnesota - 2.8% |
| 8. Montana - 5.2% | 28. Tennessee - 4.0% | 48. Virginia - 2.8% |
| 9. New York - 5.2% | 29. Florida - 3.9% | 49. New Hampshire - 2.7% |
| 10. Louisiana - 5.1% | 30. Michigan - 3.8% | 50. Iowa - 2.5% |
| 11. Mississippi - 5.1% | 31. Utah - 3.7% | |
| 12. Wyoming - 4.9% | 32. Delaware - 3.5% | |
| 13. Alabama - 4.8% | 33. Maryland - 3.5% | |
| 14. Washington - 4.7% | 34. Oklahoma - 3.4% | |
| 15. New Jersey - 4.6% | 35. Missouri - 3.4% | |
| 16. Texas - 4.6% | 36. North Dakota - 3.4% | |
| 17. Arkansas - 4.5% | 37. Connecticut - 3.2% | |
| 18. Kentucky - 4.5% | 38. Massachusetts - 3.2% | |
| 19. South Carolina - 4.5% | 39. North Carolina - 3.2% | |
| 20. Arizona - 4.4% | 40. Indiana - 3.0% | |



Directions and questions for the activity:

1. What is the population of interest?

U.S. employable residents.

2. Sample randomly 20 states using the table of random digits and compute the average unemployment rate.

using line 145: 4.5, 4.1, 3.5, 5.2, 5.2, 5.1, 4.4, 2.5, 3.0, 4.6, 3.4, 3.4, 3.2, 3.4,

6.6, 4.3, 3.2, 2.8, 5.2, 2.9 $\Rightarrow \bar{x}_1 = 3.875$

3. Resample ~~2~~ more times and get ~~2~~ more sample means based on samples of size 20.

my second sample yielded $\bar{x}_2 = 4.061$

my third sample yielded $\bar{x}_3 = 3.924$

4. Make the **three** 70% confidence intervals for the population mean based on your **three** sample means from parts 3 and 4. (Note: The population standard deviation is 1.01.)

70% CI $\Rightarrow (1-\alpha)100\% = 70 \Rightarrow \alpha = 0.3 \Rightarrow \frac{\alpha}{2} = 0.15$
 look up 0.15 inside Table A to get z^* (such that area above z^* is 0.15)
 (below)

$$z^* = -1.04$$

1st CI $\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}} \Rightarrow 3.875 \pm 1.04 \times \frac{1.01}{\sqrt{20}}$
 $3.875 \pm 0.2348 \Rightarrow (3.6402, 4.1098)$

2nd CI $4.061 \pm 0.2348 \Rightarrow (3.8262, 4.2958)$

3rd CI $3.924 \pm 0.2348 \Rightarrow (3.6892, 4.1588)$

5. Are the widths of your three confidence intervals the same? Explain!

Yes, because the margin of error is $m = z^* \frac{\sigma}{\sqrt{n}} = 1.04 \times \frac{1.01}{\sqrt{20}}$ is the same for all ~~the~~ 70% CIs

6. Are the confidence intervals all centered at the same value? Explain!

No, the center of each interval is the corresponding sample mean \bar{x} , which is of course random and will most likely change from sample to sample

7. How many of your 3 confidence intervals contained the true value of 4.11%?

two did, one did not.

8. Write your # of confidence intervals containing the value 4.11% on the chalkboard.

9. What percentage of the intervals on the board contains the true mean of 4.11%?

137 out of 207 contained the true value 4.11%
 $\approx 66\%$ not bad at all!

10. What percentage of intervals do you expect to contain the mean?

We should expect 70% to contain the true mean

11. Based on your **first sample mean**, compute a 90% confidence interval for the true unemployment rate. How does the length of the 90% confidence interval compare to the length of your first 70% confidence interval?

The CI will get wider as z^* will increase to account for the higher level of confidence, z^* is now 1.64

$$\bar{x} \pm 1.64 \times \frac{1.01}{\sqrt{20}} \Rightarrow \bar{x} \pm 0.37056 \Rightarrow 3.875 \pm 0.37056$$

$$\Rightarrow (3.47944, 4.24556)$$