

NW221 Sampling Lab

The purpose of this lab is to explore the relationship between a sample distribution and a sampling distribution. You should write all samples down on the answer sheet and turn in all work before leaving lab today. Use your calculator first to do all work and then check it using the sampling lab magic file to check your work.

Important: Make sure you do not look at the tiddlywinks as you draw your samples.

1. Draw a sample of size 20 and calculate the mean, median, mode, range, variance, and standard deviation. Report your mean and standard deviation to the instructor for display and group analysis.
2. Given that the $\mu = 20$ and $\sigma = 5.93$
 - a. What is the probability that on one trial you draw a number that is 16 or less.
 - b. What is the probability that you draw a number between 23 and 29 (inclusive).
 - c. What is the percentile rank of a score of 32?
 - d. What is the percentile rank of a score of 17?
3. Draw 5 samples of size 5 and 5 samples of size 15. (You can do one each and then use computer simulator to do 4 more each).
 - a. Calculate the mean and standard deviation for each sample.
 - b. Why do the means differ from each other? What do we call that?
 - c. Calculate the grand mean and standard deviation of the 5 means for the $n=5$ and $n=15$ samples.
 - d. What do you notice about the differences between the grand means and the standard deviations of those 5 means for sample standard deviations?
 - e. Is the difference what you would expect?
4. Calculate the standard error of the mean (using $\sigma = 5.93$) for $n = 5$ and for $n = 15$.
 - a. Compare that value to the standard deviation of the means that you calculated in 3 above. Would you expect them to be similar? Why/Why not?
 - b. Using $\mu = 20.00$ and $\sigma = 5.93$, what is the probability of drawing a sample of $n=5$ with a mean of 30 or greater.
 - c. Using $\mu = 20.00$ and $\sigma = 5.93$, what is the probability of drawing a sample of $n=15$ with a mean of 23 or greater.
 - d. What does that difference tell you about the affect of sample size on the expected results?
5. Using your original sample of size 20. Do the following test.
 - a. Test the null hypothesis that the true mean of this population is 20. Use known $\sigma = 5.93$. Below are the steps you should follow to do this test.
state null and alternative hypothesis symbolically (non-directional)
test at $\alpha = .05$, what is the decision rule? what is the decision?
 - b. Did you get a likely (expected) outcome or an unlikely one?
6. Draw a paired sample of size 10. Below are the steps you should follow to do this.
 - a. pick tiddlywink and call it an x value and then pick another tiddlywink and call it a y value.
Repeat 9 more times
 - b. draw a scatter plot of your data.
 - c. calculate r and the slope (b) and intercept (a).
 - d. using the formula $y' = bx + a$, find y' when the x score is 10 and 40
 - e. using the points found in d, plot the regression line on the plot below.

Random Pairs

X	Y

Mean =

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St. dev =

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r =

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slope (b) =

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intercept (a) =

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Plot Scatter plot and regression line here:

