YOUR TURN!

FISH Application Exercise 2
One variable (univariate) application

Refer to your *FISH User's Guide* as you work through this example.

Directions:

1. Open FISH and use the "Generate Random Data" feature to create the following data set. These data represent a set of scores on a statistics test for a class of 500. Imagine that you are a student in that class. You got 45 points on the test out of 50 possible points. The class mean was 40 points and the standard deviation was 5 points.

   Refer to your User's guide to generate the data. Here are some tips:

   a. Set N=500, choose "one variable application" and hit "set."
   b. Under step 1, choose "generate random data."
   c. Set the seed at 45640. This will ensure that you get the same data set each time.
   d. Set the mean at 40 and the standard deviation at 5. Set the minimum score at 0 and the maximum score at 50.
   e. Leave the default distribution at "normal" and click OK.

   You should have generated your data set.

2. Scroll down to find your score of 45. It should be case # 12 if you used the "45640" as the seed for the data generator.

3. Now calculate your z-score for your raw score of 45. What is it? Jot it down here:

   Your z-score is:_____________________

4. You talk to a friend later that day and he told you about the test results for his statistics class. Strangely enough, there are exactly 500 students in his class, too. On his statistics test, there was a maximum of 100 points. The mean was 70 and the standard deviation was 10. Your friend's score was 70.

5. Wow, he got a 70 and you got a 45. Of course, you, being a great statistics student, know that you can't compare his raw score to your raw score because yours was out of 50 possible points and his was out of 100 possible points. Maybe you could compare your 90% correct to his 70% correct. But maybe his test was a lot harder.

6. Reset FISH and generate the data for your friend's statistics class based on the information in #4 above. Keep the same seed—45640. You'll have to change the mean, standard deviation and maximum value.

   Your friend's raw score of 70 points is case 2. Now calculate his z-score and jot it down here:

   Your friend's z-score is: __________________

7. So comparing z-scores is a way to "standardize" your score and your friend's score on the same scale, even though the tests had different means and standard deviations.

Your z-score is close to 1. His z-score is close to 0. What does this mean? Well, one way to interpret this is that you did better than the majority (approximately 84%) of the people who took the test in your class. Your friend's score was almost exactly the average class score, so he did as well as approximately half the people in his class. So by using z-scores, you can assert that your studying paid off and you did better than your friend on this test. Remember that the sign (+ or -) of the z-score as well as the size of the z-score provides information about the scores. If you have a positive z-score, then your score is above the mean. If you have a zero z-score, your score is at the mean. If you have a negative z-score, your score is below the mean.

Notes:

1. If the sample sizes were large enough, the means would have been exactly 40 and 70 respectively and your z-scores would have been exactly 1 and 0 respectively—you can practice later by increasing the sample sizes.)
2. It is important to remember that one can only compare z-scores for samples or populations that are similar. For instance, if your statistics class was a senior honors class and your friends was introductory statistics, the z-score comparisons would not make sense.