Stat 101
Worksheet on z-scores - Solutions

SAT verbal scores are known to have a mean of 500 points and a standard deviation of 100 points. ACT scores are known to have a mean of 21 points and a standard deviation of 5 points.

1. You took the SAT verbal test and received a score of 550 points. Your friend took the ACT and received a score of 30 points. Which one of you scored better on their respective test, you or your friend?

   Compare using z-scores. For you, the z-score on the SAT was $z = (550 - 500)/100 = 0.5$. For your friend, the z-score on the ACT was $z = (30 - 21)/5 = 1.8$. So, your friend scored better on the ACT than you did on the SAT.

2. What would your score have needed to be on the SAT in order to have the same respective score as your friend had on the ACT?

   Your friend had a z-score on the ACT of 1.8. In order for you to have the same z-score, you would have needed to score 1.8 standard deviations above the mean. This is $500 + 1.8(100) = 680$. So you would needed a score of 680 on the SAT.

3. What would your friend's score have needed to be on the ACT in order to have the same respective score as you had on the SAT?

   You had a z-score on the SAT of 0.5. In order for your friend to have the same z-score, he/she would have needed to score 0.5 standard deviations above the mean. This is $21 + 0.5(5) = 23.5$. So your friend would have needed a score of 23.5 on the ACT.