# Chapter 11 Exercises

**Prerequisites**
All material presented in chapter 11

1. Define power in your own words.

2. List 3 measures one can take to increase the power of an experiment. Explain why your measures result in greater power.

3. Population 1 mean = 36

   Population 2 mean = 45

   Both population variances are 10.

   What is the probability that a t test will find a significant difference between means at the 0.05 level? Give results for both one- and two-tailed tests. Hint: at one-tailed .05 is a two-tailed 0.10

4. Rank order the following in terms of power.

| | Population 1 Mean | n | Population 2 Mean | Variance |
|---|---|---|---|---|
| a | 29 | 20 | 43 | 12 |
| b | 34 | 150 | 40 | 6 |
| c | 105 | 24 | 50 | 27 |
| d | 314 | 4 | 120 | 10 |
| e | 30 | 31 | 41 | 8 |

5. Alan, while snooping around his grandmother's basement stumbled upon a shiny object protruding from under a stack of boxes . When he reached for the object a genie miraculously materialized and stated: "You have found my magic coin. If you flip this coin an infinite number of times you will notice that heads will show 60% of the time." Soon after the genie's declaration he vanished, never to be seen again. Alan, excited about his new magical discovery, approached his friend Ken and told him about what

he had found. Ken was skeptical of his friend's story, however, he told Alan to flip the coin 100 times and to record how many flips resulted with heads.

(a) What is Ken's null hypothesis?

(b) What is the probability that Alan will be able convince Ken that his coin has special powers by finding a p value below 0.05 (one tailed).
Use the Binomial Calculator (and some trial and error)

(c) If Ken told Alan to flip the coin only 20 times, what is the probability that Alan will not be able to convince Ken (by failing to reject the null hypothesis at the 0.05 level)?