Answer Key: Hypothesis Testing Concepts

1.) Your answer

2.) Standard error of the mean is the average distance of all sample means of a given size (n) from the population mean. Standard deviation is the average distance of individual scores from a sample mean.

The normal curve distribution is a frequency distribution for assessing the properties of **individual scores** in a data set. A sampling distribution of means is a theoretical frequency distribution of **group averages** obtained by selecting all possible samples of a specific size from a population. BOTH distributions are symmetric and unimodal. BOTH distributions have tables (z and t) that we can apply to data sets. The differences?? There is only one z distribution, it follows the 68-95-99 rule and the entire table is included in most stats textbooks. HOWEVER, there is a different t distribution (curve) for every sample size, t distributions for larger and larger sample sizes move closer and closer to the 68-95-99 bell shape, and only the most commonly used t-Table probabilities (critical values) are included in the textbook.

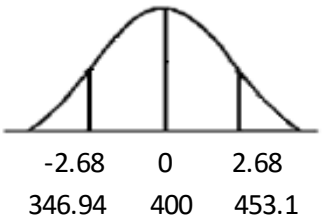
3.) **Good response:** A one-sample t-test revealed that Stormy's new wax significantly reduced the average course speed for her group of skiers. Her group of skiers completed the course in 51.5 sec. while the completion time for the population was 52.8. The team should continue to use the wax and probably experiment with the wax under different conditions and at different courses. Though her group's average time was only 1.3 seconds faster, in skiing, where fractions of seconds count, the use of this wax could provide a meaningful advantage for Stormy's team.

Poor response: Stormy's team totally shredded the course. It was, like, unbelievable. This wax is some gnarly stuff. Dude, if she keeps using it, her team will be blazing fast.

4.) Your answer

5.)

$S_M = \frac{141.42}{\sqrt{51}} = 19.80$



C.I. 99%

$CI = M \pm (t \times S_M)$

$CI = 400 \pm (2.68 \times 19.80)$

$CI = 346.94$ and 453.064

The true average weight of steers in the population is between 346.94 lbs. and 453.064 lbs, with 99% certainty.

6.) Your answer

7.) The probability of obtaining a significant result increases if a sample size increases, if alpha is increased (from .01 to .05), or even is a one-tailed test is used. These manipulations would not change the actual mean difference between the samples, though variability would probably decrease somewhat. The problem with these methods is that meaningless results get published; the public becomes cynical of suspicious of research studies, and important findings become lost behind these manipulated studies.

8.) Your answer

9.) Your answer

10.)

a. $p>.05$
b. $p<.05$
c. $p<.05$
d. $p>.05$
e. $p>.05$
f. $p>.05$
g. $p<.05$
h. $p>.05$
i. $p<.05$