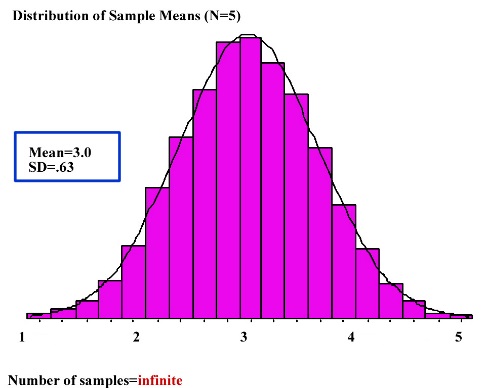
TRUE OR FALSE? If the statement is *false*, how could you correct it to make it true?

1. µ is an example of a parameter estimate, because it is a value used to estimate the actual value in the population.
2. Parameters will rarely be known, and can only be estimated by sample statistics.
3. As long as the samples are randomly selected, if we pull multiple samples from the same population, the sample statistics (e.g., the sample means) should be identical to one another.
4. A sampling distribution is a frequency distribution of standard deviations computed from multiple, identically-sized random samples.

Use the following diagram of a sampling distribution, for questions #5 through #8.



1. 3.0 is a good estimate of the mean of the population, given what statisticians have demonstrated through the Central Limit Theorem.
2. 5 is a good estimate of the standard error.
3. The height of a given bar (e.g., the bar centered on the number 2) represents the number of samples that had that mean (i.e., a mean of 2, in this case).
4. If we calculated the percentage of samples that had a mean of 1.5 or lower and we found that 2.3% of samples had a mean of 1.5 or lower, we could say that the p-value associated with drawing a sample of 1.5 or lower was .023.
5. According to the Central Limit Theorem, the sampling distribution has a bimodal distribution.
6. Conceptually, the standard error tells us information about whether the sample means are clustered closely or widely scattered around their own average.
7. A large standard error means that any given sample’s mean is probably fairly representative of the parameter µ.
8. A small standard error means that the sample means in the sampling distribution are tightly packed around the overall mean.
9. If we draw a random sample, calculate its standard error, and see that the SE is pretty low, this suggests that x̄ is likely a good estimate of µ.
10. If our sample has x̄ = 15, s = 5, and N = 25, our SE is 1.00
11. If our sample has x̄ = 16, s = 3, and N = 81, our SE is 0.33
12. If our sample has x̄ = 21, s = 7, and N = 100, our SE is 0.30

**KEY**

1. False. µ is not a parameter *estimate,* but rather µ itself IS a parameter. µ means the value of the mean in the actual population. To correct this statement, you might have written: x̄ is an example of a parameter estimate, because it is a value used to estimate the actual value in the population (i.e., µ).
2. True.
3. False. You may have corrected this statement as follows: *Even if* the samples are randomly selected, if we pull multiple samples from the same population, the sample statistics (e.g., the sample means) *are not likely to* be identical to one another.
4. False. There’s a simple correction to this one: A sampling distribution is a frequency distribution of *sample means* computed from multiple, identically-sized random samples.
5. True. Remember that the Central Limit Theorem says that the mean of a sampling distribution will be equal to the mean of the population. 3.0 is the mean of the sampling distribution given, therefore 3.0 is a good estimate of the mean of the population.
6. False. In this example, n=5 (given at the top of the diagram) indicates that the size of each sample that was drawn is n=5. If we wanted to estimate the standard error, you could first think about what is meant by the standard error – it is the standard deviation of the sampling distribution, which is actually given to us here (.63). [Another way to determine the standard error is to use the formula SE = s / √N (standard deviation calculated from one sample divided by the square root of the number of people in that sample); however we cannot use this formula here because we do not have the standard deviation of one of the samples.]
7. True.
8. True. The percentage chance or probability of drawing a sample with a particular mean or higher (or a particular mean or lower) can be written in terms of a decimal and labeled as a “p=value”. In this example, if there’s only a 2.3% chance that we would have drawn a sample with a mean of 1.5 or lower from this population, we could say that the p-value associated with drawing a sample of 1.5 or lower is .023, or we could write *p* = .023.
9. False. To correct this, change “bimodal” to “normal.” According to the Central Limit Theorem, the sampling distribution has a *normal* distribution.
10. True. This is one way to think about the standard error (i.e., the standard deviation of the sampling distribution).
11. False. A large standard error suggests that the means of the random samples probably vary quite widely, which suggests that we do *not* know whether any given sample’s mean is going to resemble the population mean, µ. To correct this statement, you could have written: A *small* standard error means that any given sample’s mean is probably fairly representative of the parameter µ. OR, A large standard error means that any given sample’s mean may be a poor estimate of the parameter µ.
12. True.
13. True. Small standard errors mean that most samples drawn from that population will have means close to the mean of the sampling distribution. Since the CLT says that the mean of the sampling distribution will equal the mean of the population, this suggests that if our standard error is low, the mean of that sample (x̄) will be a good estimate of the mean of the population, µ.
14. True. is the formula for the standard error. We know that s = 5, and the square root of 25 is 5. So 5/5 = 1.00
15. True. is the formula for the standard error. We know that s = 3, and the square root of 81 is 9. So 3/9 = 0.33
16. False. If s = 7, and N = 100, our SE is 7 divided by (square root of 100=10) = 7/10 = 0.70