Answers to the Multiple Choice Questions

1. **C**  The least squares regression line is a **prediction** tool. Therefore answers must address the fact that the slope is an estimate, approximate, or prediction of the true LSRL. This slope is the predicted change in the y value that corresponds to a 1 unit change in the x value.

2. **D**  The means are subtracted; to find the new standard deviation for the difference in means, the variances must be added.

3. **D**  Choice A: A Random selection from a population allows generalizations back to the population – this is different than random assignment. Choice B: For experiments on plants the placebo effect is not a concern with plants. Choice C: Random assignment distributes the effects of other variables it does not eliminate them.

4. **A**  Choice B: There is no grouping in a simple random sample. Choice C: Cluster random sampling chooses a group randomly and surveys all persons in that group. Choice D: Blocking is used in experiments.

5. **C**  Choice A: A residual plot is the appropriate method to use for evaluating a linear model. Choice B: The curved pattern suggests that there is an association but not a linear association. Choice D: A similar number of points above and below the horizontal line is desired, but not with a pattern in the points.

6. **B**  Choice A: There are a fixed number of trials n = 30. Choice C: There are 30 trials for each sample. Choice D: The probability of generating the number 4 is 1/5 or 0.20.

7. **A**  Choice B: Intervals don’t give us any information about the percentage of specific population observations are contained in them. Choice C: This specific interval taken from only one sample doesn’t speak to the long-term success rate of the method. Choice D: Avoid the word – or in this case the symbols – for “probability” because once the interval is set, it has either captured the true parameter (probability = 1) or it hasn’t (probability = 0).

8. **C**  Choice A: Confidence intervals capture population means not individual values. Choice B: Specific confidence intervals once calculated are either 100% successful or 0% successful. Choice D: Confidence intervals are estimating population means, not sample means.

9. **B**  Choice A: This is the interpretation of the confidence **interval**, not **level**. Choice C: Population means are captured, not sample means. Choice D: Confidence intervals capture population means with no specific endpoints.

10. **A**  Type I: Reject the null when the null is true: You decide it will not rain but it does rain. Type II: Fail to reject the null when the null is false: You decide it will rain but it does not rain. Choice A: This type I and type II. Choice B: These are correct decisions. Choice C: This is Type II and power. Choice D: This is type II and type I (reversed answers).

11. **B**  

    \[ P(A|B) = \frac{P(A \cap B)}{P(A)} = \frac{0.20}{0.25} = 0.80 \]

   Or just by looking at the tree diagram...if you bypass the 0.25 branch (because it says “given that it’s raining”), you will see that you have a 0.8 chance of being on time.

12. **C**  

    \[ P(B|A) = \frac{P(B \cap A)}{P(B)} = \frac{0.05}{0.05 + 0.075} \]