The last two pages of this document address various questions you may have as you work these problems.

Orientation Problems.

1. Solve 17x + 1 = 0.379 Give the answer using four decimal places. (In this course a statement like this always means "rounded correctly so that the answer is correct to at least four decimal places.")

2. Solve 16x + 1 = 65 Give the answer using two decimal places. (In this course a statement like this always means "rounded correctly so that the answer is correct to at least two decimal places.")

3. A particular statistics question is answered using simulation, and the interval is -0.083 to 1.679. What is the length of that interval? Choose the number here that is closest to that length.

   Choices: 0.52 0.53 0.78 0.84 0.96 1.52 1.98

4. Consider the natural log function, called log(x). Use Taylor's Theorem to find a linear approximation to the function f(x) = log(x), expanded around x = 2. Then use that to estimate log(2.8). Choose the number here that is closest to your estimate of log(2.8).

   Choices: 1.00 1.10 1.20 1.30 1.40 1.50

5. This problem has two parts. For each part, find the solution and then, among the choices given, choose the number closest to that.
   a. Solve $3x+3=8$
      Choices: -1 0 1 2 3 4
   b. Find the square of that solution to the equation in part a.
      Choices: 1 2 3 4 5 6

6. This problem has **one algebra problem** to solve even though there are four parts to answer. The different parts are to illustrate different ways that the choices for the answer might be given. This is simply to help you become accustomed to this "choose the closest number" method of giving the answer.
   a. Solve $14x^2 - 23x + 15 = 12$ What is the smallest number in your solution set? Choose the number here closest to that solution.
   Choices: -4.5 -4.0 -3.5 -3.0 -2.5 -2.0
   b. Solve $14x^2-23x+15=12$. What is the smallest number in your solution set? Choose the number here closest to that solution.
   Choices: 1.7 2.4 3.2 4.5 6.0 8.2 9.7 12.9
   c. Solve $14x^2-23x+15=12$. What is the smallest number in your solution set? Choose the number here closest to that solution.
   Choices: -1.2 0.2 2.4 3.2 4.5 6.0 8.2 9.7 12.9
   d. Solve $14x^2-23x+15=12$. What is the smallest number in your solution set? Choose the number here closest to that solution.
   Choices: -3.2 -0.4 -0.2 -0.1 0.1 0.3 0.4

7. Consider the expression $y^{8.321n}$. On your computer, increase the size in which you are viewing this several times, so that the small print is very clear. When working on problems in this course, use that process to view ANYTHING that is not completely clear to you, particularly in exponents. It is crucial to be completely certain of all the numbers and symbols.
   The question to answer here: Did you increase the viewing size at least twice?

   Choices: Yes No

8. This exercise is designed to help you become familiar with some challenges of multi-step problems (in this course and in real life.)
   The most important challenge is that the earlier steps are the most crucial – you can't hope to earn credit for the later parts if you make a mistake in an earlier part.

   Solve this equation for x: $2.8320+1.0530e^{3.7890x}=18.210$. Give the final answer using five decimal places. (In this course a statement like this always means "rounded correctly so that the answer is correct to at least five decimal places.")

   a. Find the value of $1.0530e^{3.7890x}$. Enter your answer using two decimal places.
   b. Find the value of $e^{3.7890x}$. Enter your answer using two decimal places
   c. Find the value of $\log\left(e^{3.7890x}\right)$ where log is the natural log (base *e*, **not** base 10) as will always be the case in this class) Enter your answer using two decimal places.
   d. Find the value of *x*. Enter your answer using five decimal places.

   Comment:

   This problem was also designed to illustrate why you need to compute with more precision than you will report for the intermediate results in a problem. In order to make this very clear, this problem is more "extreme" than the problems you'll see in the course in terms of the difference in precision between the first three parts and the last part.

   Calculations done with scientific calculators or software do some rounding. However they keep MANY more decimal places than most people will if they are writing out the intermediate results and using those to go to the next step. As a data scientist you must know how to calculate results to an appropriate precision. It is important to make your choices how much precision is needed at the end of the problem before you start computing anything.

9. This is not another problem, but a caution.
   There are "theory" problems in some assignments. It is not realistic to give you examples of those here. You'll see some of those in starting in Week 2, with Homework 1. Additional instructions on how to answer those will be provided at the beginning of the Homework 1 assignment in edX and will apply to all such problems in all assignments in the course.

Purposes of the Orientation Problems.

1. Practice using different methods in which you will be asked to give numerical answers.
2. Practice answering questions in edX with a single part and others with multiple parts.
    a. Including changing answers in edX. (Assignments in this course allow you to change your answers as many times as you wish during the time you are allowed to work on your assignment.)
    b. Including making sure all of your answers are what you intend and show as submitted.
3. Understand the role of, and how to use, Canvas (https://canvas.utexas.edu/ to upload your work immediately after your deadline if you think that some system error interferes with the submission. (You must also give a reason you are doing this in an email message to the course email address.)

Differences between the Orientation Problems Assignment and the other assignments in the course.

1. The Orientation Problems assignments count much less in your grade than the Homework, Quiz, and Exam assignments.
2. Questions in the Orientation Problems assignments are about algebra and calculus. Questions in the main assignments are about probability or statistics.
3. The Orientation Problems assignments are shorter than main assignments.
4. In the main assignments, no feedback on whether any answer is right or wrong is available until the solutions are posted 8 hours after the deadline for the assignment, and individual students' grades are visible on Saturday following the deadline for the assignment.
   The solutions in the Orientation Assignment are shown in a similar way to the solutions of the actual assignment (in a separate item in the edX folder**) but they are visible at the same time as the problems**.

Rationale for two different approaches to grading numerical answers.

Our work in this course includes computing numbers from formulas AND giving numbers from simulations. Our two methods of submitting numerical answers are

- "Choose the closest number."
- "Give the answer using ___ decimal places."

Some problems done with simulations are better suited to "choose the closest number" than "give an answer using a certain number of decimal places." But any problem requiring a numerical answer can be set up to answer in either way.

Rounding Rules

Use the standard method of rounding:

"Round to the closest value. For exactly half, go up."

Examples (if you are asked to round to the nearest integer):

23.422 goes to 23; 9.7 goes to 10; 14.500 goes to 15

Do not round during "intermediate calculations." Round only at the end of your calculations.

Some issues with reporting answers with a certain number of decimal places.

1. When giving an answer which is specified as using a certain number of decimal places, trailing zeros (after the decimal point) may be omitted. For example,
   $\frac{170}{10} = 17.00 = 17.0 = 17$.

2. When asked to report an answer with a certain number of decimal places, it is acceptable to include an extra decimal place (or even more) of your precisely computed answer. (But do proofread carefully to at least one digit past the required number of digits – the more digits you type, the more places in which you could type in a wrong digit or transpose two digits.)

3. Rounding.
   - Round ONCE – after you have completed all your calculations. Do not round in intermediate steps.
   - Use the standard method of rounding: "Round to the closest value." That means:
     - Compute your final result to more decimal places than you will report.
     - If the first digit you are eliminating is a 5 or higher, go up.
     - If the first digit you are eliminating is a 4 or lower, go down.

     Examples (if you are asked to round to the nearest integer):
     9.4 goes to 9; 22.500 goes 23; 22.499 goes to 22.

Some considerations involving "choose the closest number" answers.

For all problems in this course requiring you to choose the closest number, it is important that you first compute an answer as precisely as you can. After that, identify which two of the choices it is between and then make sure you do enough calculations to be sure which is the closest.

If you are asked to do a further calculation with the result, be sure to use the number you computed as your answer, NOT the number in the choice of the closest number to your answer.

The problems requiring the closest answer are designed so that, if you do them as required, the correct answer is NOT exactly halfway between two of the choices. On an individual problem, while it is possible we made a mistake and that is the case, do NOT assume that very quickly. Consider your procedure carefully. In simulation problems, you are being required to estimate the variability in the results of your correct simulations as well as obtaining a "center." Do enough simulations to get the variability low enough to choose a closest answer. If you do think the correct answer is exactly halfway between two of the choices, this is a place you must document your work and submit that document in the required manner.