Math 200 - FTC 1

Name _____

This assignment will be due via the D2L assignment folder on or before 11:59pm on Saturday 09/05/2020. Late submissions will not be accepted. Please do your work neatly on separate paper.

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1. (4pts) A student, Brittnay, has been carefully studying the following staircases formed by gluing same sized cubes together.

   If all of the *unglued* faces (including the bases) are to be painted, Brittnay is wondering if there is a pattern or formula that would help her figure out how many faces there are to paint on a staircase that is 100 cubes long and 100 cubes tall.

   Find a formula and/or pattern that will determine how many unglued faces are to be painted on a staircase that is 100 cubes long and 100 cubes tall. Use this formula or pattern to find the number of painted faces.

2. (4pts) In class, you (as the teacher) add $1+3+5+7+9+11+13+15+17+19$ using the Gaussian method and get 100. A student, Olisa, raises his hand and says: "$1+3=4$ which is 2^2 and $1+3+5=9$ which is 3^2 and $1+3+5+7=16$ which is 4^2. So, since there are 10 numbers being added, the answer must be 10^2 which is 100!". Is Olisa's method right or wrong? Draw a picture to either support or contradict Olisa's findings. (Remember that just because you get the right answer doesn't mean the process was correct.)

3. (2pts) A student, Gabe, gives you his "new" way to add the natural numbers 1 to 100. Look at his technique below and explain if his technique is valid or not. If the technique is valid, explain the pattern, if it is not valid, explain where the pattern fails.

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\begin{aligned}
&1+2+3+4+5+6+7+8+9+10=55\\
&11+12+13+14+15+16+17+18+19+20=155\\
&21+22+23+24+\cdots+30=255\\
&31+\cdots+40=355\\
&\cdots\\
&91+92+\cdots+100=955\\
&\textbf{So},\ \mathbf{55+155+255+\cdots+955=5050}
\end{aligned}
$$