MTH 225 Learning Target Mini-Quiz November 8, 2021

Directions:

- Do only the problems that you need to take, and feel ready to take. If you have already earned Fluency on a Learning Target, do not attempt a problem for that Target! You can skip a Target if you need more time to practice with it, and take it on the next round.
- **No internet-connected technology is allowed**, **including smartphones**, **tablets**, **or laptops**. Handheld calculators, including graphing calculators, are OK as long as they do not connect to the internet.
- The criteria for "success" is shown on each problem. Please note, some problems may *require* work or an explanation to be shown while others may not require it. On those that don't require work or explanations, you may still show work or explanations if you want, and if there is an error that can be traced to a "simple" mistake in your work, this will be taken into consideration when grading.

Learning Target RI.1 (CORE): *I can generate several values in a sequence defined using a closed-form expression or using recursion.*

Generate the first six (6) terms of each of the following sequences. You do not need to show your work, but your answers must be correct.

Success means: At least three of the four sequences have all six terms correctly listed.

1. $a_n = n^2 + n + 1,$ where $n = 1, 2, 3, \ldots$
2. $b_n = 1 + 2^n$ where $n = 0, 1, 2, \ldots$
3. $c_0 = 4,$ and $c_n = 2c_{n-1} + n$ if $n > 0$
4. $d_0 = 3, d_1 = 2$ and $d_n = 2d_{n-1} - d_{n-2}$ if $n > 0$

Learning Target RI.2: *I can use sigma notation to rewrite a sum and determine the sum of an expression given in sigma notation.*

Either compute the value of the sum given in sigma notation, or write sigma notation that correctly represents the sum. You do not need to show your work, but your answers must be correct.

Success means: At least three of the four answers are completely correct.

1. Compute both sums below:
   (a) $\sum_{n=1}^{6}(n^2+n+1)$
   (b) $\sum_{n=2}^{4}(1+2^n)$
2. For each sum below, write the sum correctly using sigma notation:
   (a) $1+3+5+7+9$
   (b) $1+2+4+8+16+32+\cdots+1024$

Learning Target RI.3: *I can find closed-form and recursive expressions for arithmetic and geometric sequences.*

For each sequence below, find *both* a closed formula *and* a complete recursive definition for the sequence. You do not need to show your work, but your results must be correct.

Success means: At least three of the four answers are completely correct.

1. $1, 3, 5, 7, 9, \ldots$
2. $1, 2, 4, 8, 16, 32, \ldots$
3. $2, 4, 6, 8, 10, 12, \ldots$
4. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots$