Math 4997-3 Quiz 1: Due by 2021/09/02

Exercises

1. Programming on paper (2 credits):
   Write the shortest valid C++ program on paper.

2. Interpreting programs (2 credits):
   What does the program in the following listing do if, when it asks you for input, you type two names (for example, Mike Tiger)? Predict the behavior before running the program, then try it.

```
#include <iostream>
#include <string>

int main(){

    std::cout << "What is your name? ";
    std::string name;
    std::cin >> name;
    std::cout << "Hello, " << name
              << std::endl << "And what is yours? ";
    std::cin >> name;
    std::cout << "Hello, " << name
              << "; nice to meet you too!" << std::endl;

    return EXIT_SUCCESS;

}
```

Programming exercises

1. Loops (2 credits):
   Write C++ program that computes for an arbitrary n

   - $\sum_{i=1}^{n} i^2$ using a `for` loop (1 credit)
   - $\sum_{i=1}^{n} f(i)$ with $f(x) = \begin{cases} x, & \text{if } x \text{ is even} \\ -x, & \text{else} \end{cases}$ 1 (credit)

2. Gaming: (2 credits)
   Write a guessing game where the user has to guess a secret number. After every guess the program tells the user whether their number was too large or too small. At the end the number

of tries needed should be printed. It counts only as one try if they input the same number multiple times consecutively.

3. Taylor Series (2 credits):
   Write a program that computes the Taylor series for the sin function

$$sin(x) = \sum_{n=0}^{N} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$$

   for a given n. Next, use the `std::sin` function of the `cmath` header of the C++ standard library to obtain the need n such that your implementation and the C++ standard implementation has the same first 5 digits for a given x.