CSci 1113
Midterm 1

Name: _____

Student ID: _____

Instructions: Please pick and answer any 7 of the 8 problems for a total of 70 points. If you answer more than 7 problems, only the first 7 will be graded. The time limit is 50 minutes. Please write your answers in the space provided. The exam is open book and notes. You may use electronic devices to ONLY look at either an e-book version or electronic notes. You may not use the internet, compiler or any other outside resources. (If you are typing on your keyboard/input device for anything other than ctrl-F to find words in the e-book or notes, this is probably not acceptable.)

Problem (1) [10 points] Assume there exists some variable called "x" (that has been both declared and initialized). Write code to store the following value in "d": (Note: The definition of factorial (the "x!") is the product of all positive integers less than or equal to "x". For example, if $x = 4$, then $x! = 4*3*2*1$.)

$$d = x!$$

Problem (2) [10 points] Show all integers of `x` for which the following if-statements are true. If the range of integers is infinite, show at least the six closest to the value 0 (with a ... indicating that the pattern continues).

```
(a) if( x == 2 || x < 2)
(b) if( !( x == 1 || x == -1) )
(c) if( x/3 == x/4 )
(d) if( false && (x/10 > 32 && x%2 == 0)
             && (2 < x && sin(x) > 0)
             && ( x*x*x + 3*x + 4 == x*x - 2*x ) )
(e) if( !(x < 2 && x%2 == 1 ) && x < 2)
```

Problem (3) [10 points] Write a loop to cout the following values: (Note: You may ONLY use cout inside of a loop and you can ONLY write one loop per part.)

(a) 1 2 3 4 5 6 7 8 9 10
(b) 10 9 8 7 6 5
(c) 10 8 6 4 2 0 -2 -4
(d) 1 2 4 8 16 32 64 128 256 1024
(e) 1 2 3 4 6 7 8 9 11 12 13 14 16 17 18 19
(Look carefully at above.)

Problem (4) [10 points] Apurva likes reading books. Every week she reads 10 more pages than last week. Write a C++ program to determine the total number of pages Apurva will read after a number of weeks. Input both the amount of pages Apurva is reading on the first week and the number of weeks you want to count how many pages she read.

```
(first input is initial pages, second is number of weeks)
Example 1 input: 100 1
Example 1 output: 100

Example 2 input: 100 2
Example 2 output: 210

Example 3 input: 100 3
Example 3 output: 330
```

Problem (5) [10 points] What is the output of this code?

```cpp
for(int i=0; i < 7; i++) {
    if(i%3 == 0) {
        for(int i=0; i < 7; i++) {
            cout << "#";
        }
        cout << endl;
    }
    else {
        cout << "#\n";
    }
}
```

Problem (6) [10 points] A user will input a number with commas separating the thousands, millions and/or billions places. This number will always have a decimal place and some digits afterwards (without any commas). Write a C++ program that displays this input number multiplied by 3 (without any commas).

```
Example 1 input: 1,000.0000001
Example 1 output: 3000.0000003

Example 2 input: 1,234,567.89
Example 2 output: 3703703.67
```

Problem (7) [10 points] Find 3 possible places for errors in the following code (assume no issues with parts not shown, such as #include). Assume no user-defined global variables exist. Explain specifically what causes the error and whether it is a syntax, runtime or logic error.

```
int main(){
    char c;
    int v=0, k=0;
    while(c != '.') {
        cin >> c >> endl;
        if(c == 'a' || 'e' || 'i' || 'o' || 'u') {
            v++;
        }
        if(k == 'k') {
            k++;
        }
    }
    cout << "In this sentence, there are: " << endl;
    cout << v << " lower case vowels" << endl;
    cout << k << " letter k's" << endl;
}
```

Problem (8) [10 points] Write a C++ program that reads a person's full name from the keyboard. The user can either input their name as "first middle last" or "first last". Your program should then output their last name first followed by a comma, so either "last, first middle" or "last, first" respectively. (Note: You must ensure that regardless of which way the user enters, the program will proceed past your last cin line without any extra input.)

```
Example 1 input: Allie Funk
Example 1 output: Funk, Allie

Example 2 input: Jon Raymond Garbe
Example 2 output: Garbe, Jon Raymond
```