Name:		
(as it would appear on official course roster)		
Umail address:	@umail.ucsb.edu	**section**
Optional: name you wish to be called if different from name above.		
Optional: name of "homework buddy" (leaving this blank signifies "I worked alone"		

1

h04

CS16 W17

h04: Chapter 3, section 3.1 - 3.3

ready?	assigned	due	points
false	Thu 01/19 03:30PM	Tue 01/24 03:30PM	25

You may collaborate on this homework with AT MOST one person, an optional "homework buddy".

MAY ONLY BE TURNED IN IN THE LECTURE/LAB LISTED ABOVE AS THE DUE DATE,
OR IF APPLICABLE, SUBMITTED ON GRADESCOPE. There is NO MAKEUP for missed assignments;
in place of that, we drop the three lowest scores (if you have zeros, those are the three lowest scores.)

Read Ch 3.1 -3.3, pages 112-118,120 -154 (If you do not have a copy of the textbook yet, there is one on reserve at the library under "COMP000-STAFF - Permanent Reserve").

PLEASE WRITE ALL YOUR ANSWERS IN THIS SHEET. HOMEWORKS SUBMITTED IN A FORMAT DIFFERENT FROM THE PROVIDED TEMPLATE WILL RECEIVE 0 POINTS. PLEASE MARK YOUR HOMEWORK CLEARLY, REGARDLESS OF IF YOU WRITE IT OUT IN INK OR PENCIL!

Please:

- **No Staples**.
- **No Paperclips**.
- **No folded down corners**.

1. (6 pts) Precedence rules determine how the compiler groups operators and operands when evaluating an expression in the absence of paranthesis. For each of the following expressions add paranthesis to show how the expression is evaluated according to the C++ precedence rules?

```
a) x == 2 || y > 20          (x == 2) || (y > 20)

b) !y && x < 9 * 2 || y < x   ((!y) && (x < (9 * 2))) || (y < x)

c) x + 7 > 10 || x + 23 < -7   ((x + 7) > 10) || ((x + 23) < -7)
```

2. (2 pts) Show the output of this code AND the final value of x for the following code.

```
int x = 17;
while ( x > 0) {          17        the final value of x is -3
   cout << x << endl;     12
   x = x - 5;             7
 }                        2
```

3. (2 pts) What is the outcome of the following code?

```
int x = 0;
while ( x = 2 && x <10 && x+=2) {   An error message: Expression is not assignable
   cout << x << endl;               "x=2" "x+=2"is not assignable to a boolean expression
 }
```

5. (6 pts) What is the result (i.e. TRUE or FALSE) of the following Boolean operations in C++, given that: x = 2, y = -1, z = 0

```
a) (x == 6) FALSE
b) !(y > 0) TRUE
c) ((x == 2) || (y > 20)) TRUE
d) ((x >= 3) && (z <= 12)) FALSE
e) ((x > y) && (y < z)) TRUE
f) ((!(x < z) || (y > z)) && (z == 12) && (y == 10)) FALSE
```

6. (9 pts) Using plain, nested or multiway if-else statements ONLY write a program that outputs the grade of a student given an integer variable 'score'. The program should read in the student's score from standard input. If the score is outside the range of 0 and 100, the program should output "Not a valid score" and exit. Otherwise it should output the string "Grade is X" where X is replaced by the student's letter grade according to the following rubric:

```
90 <= score <=100, grade = 'A'| 80 <= score < 90 , grade = 'B'| 70 <= score < 80 , grade = 'C'|
60 <= score < 70 , grade = 'D' | 0 <= score < 60 , grade = 'F'
```

…..a) Make your program easy to read and understand. Format your answers so that they are readable on the display. This means consider your use of "\n" characters and the proper formatting of decimal places in the displayed numbers to the user.

…..b) Test this program out by compiling it and running it the same way you do this with lab assignments. When you are sure that you have a working program, write it out in the space provided below. You will be graded for programming style as well as having a functionally correct program.

```cpp
#include <iostream>
using namespace std;
int main(){
        int score;
        cout << "Enter your score: ";
        cin >> score;
        if (score >= 90 && score <= 100){
                cout << "Grade is A" << endl;
        }
        else if (score >= 80 && score < 90 ){
                cout << "Grade is B" << endl;
        }
        else if (score >= 70 && score < 80 ){
                cout << "Grade is C" << endl;
        }
        else if (score >= 60 && score < 70 ){
                cout << "Grade is D" << endl;
        }
        else if (score >= 0 && score < 60 ){
                cout << "Grade is F" << endl;
        }
        else{
                cout << "Not a valid score" << endl;
                return 0;
        }
        return 0;
}
```

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h05

CS16 W17

h05: Chapter 3, section 3.4, Chapter 4, section 4.1-4.2

ready?	assigned	due	points
true	Tue 01/24 03:30PM	Thu 01/26 03:30PM	44

You may collaborate on this homework with AT MOST one person, an optional "homework buddy".

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Complete the reading of Chapter 3 and additionally read Chapter 4 section 4.1-4.2
(If you do not have a copy of the textbook yet, there is one on reserve at the library
under "COMP000-STAFF - Permanent Reserve").

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1. (2 pts) What is a runtime error in C++?

   An error that occurs during the execution of a program.

2. (6 pts) Use precedence rules to re-write the following expressions:

(i) x / 4 - 3 == 1 && 6 * x + y > 0

   (((x / 4) - 3) == 1) && (((6 * x) + y) > 0)

(ii) a / b * b < 0.5 || --flag >= 0

   ((a / b * b) < 0.5) || ((--flag) >= 0)

(iii) z * m + n / v >= 5 && b + c - d != 0 || f < g

   (((z * m) + (n / v)) >= 5) && ((b + c - d) != 0) || (f < g)

3. (4 pts) What is the output of the following statements?

```
int p = 5;
while (--p > 0)
    cout << p << " ";
```

   4 3 2 1

4. (4 pts) What is the output of the following statements?

```
int s = 1;
do
    cout << s << " ";
while (s++ <= 5);
```

   1 2 3 4 5 6

5. (4 pts) Same question as above, but the last statement now reads:

```
while (++s <= 5);
```

   1 2 3 4 5

6. (10 pts) Write a function named 'check_descending' that takes three arguments of type int and returns true if the arguments are in descending order; otherwise, it returns false. You can use any type of C++ statements that we've gone over in class so far to accomplish this goal.

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```cpp
bool check_descending(int a, int b, int c){
        if(a > b && b > c)
        return true;
        else
        return false;
}
```

7. (6 pts) The infinite series: s = 1 + (2/3) + (4/9) + (8/27) + ... is a geometric series that converges to a whole rational number (i.e. like 2 or 3 or 4). Below is an unfinished C++ program that will calculate s to the kth position (so, for example, if k = 1, then s = 1 + (2/3) = 1.666...). Fill in the missing code:

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main(){
    double s(0.0);
    int k(0);
    cout << "Enter k: ";
    cin >> k;
    for (int i = 0; i <= k; i++ )
{

        s =     s + pow(2.0 /3.0, i)                      ; }

    cout << "Series converges to: " << s << endl;
    return 0;
}
```

8. (8 pts) Compile and run the above completed program. What is the value of s if k = 6? if k = 19 ? What whole rational number does s look like it's approaching? What is the smallest value of k for s to be shown by the program as exactly equal to that whole number?

When k = 6 , s = 2.73663
When k = 19, s = 2.99865
It's approaching 3.
Smallest value of k is 33