Warm Up Exercises Week 2

1. The distance between two point sin a coordinate system is given by the formula

$$\sqrt{(x_1^2 - x_2)^2 + (y_1 - y_2)^2}$$

   Write a program to read in the coordinates of the two points and write out the distance between them. You will need to use <cmath> and the sqrt fnction

2. Write a program to compute the following expressions

$$F(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7}$$

3. Write a program that will print out in a neat table values of the following function $f(x) = 3x^3 – 5\ x^2 + 6x – 2$, for integer values of x from -5 to 5

4. The amount A, that a principal P, accumulates when interest is compounded annually is given by $A = P(1 + r)^n$, where r is the % rate as a decimal (so 4% is 0.04 and 12 % is 0.12 etc) and n is the number of years. Compute the amount a principal of 5000 has become in 10 years when the interest rate is 4%. You may use pow(x,n) found in <cmath > where $pow(x,n) = x^n$.

5. find at least five syntax errors in the following program

```
#include iostream
int main()
(cout << “please enter two numbers” << endl
cin >> x >> x; >> y;
cout << “the sum is ” << x+y << endl;
Return;
}
```

6. find at least three logic errors in the following program

```
#include <iostream>
using namespace std;
int main()
{
int total;
int x1;
cout << “please enter a number ” << endl;
cin >>x1;
total = total + x1;
cout << “please enter another number x2”;
int x2;
```

```
cin >> x2;
total = total + x1;
float average = x1+x2/2;
cout << "the average is " << average << endl;
return 0;}
```

7. Write the following mathematical expressions in C++
   $s = ut + ½ at^2$
   declare all variables as doubles or floats
   $F = G\frac{mM}{r^2}$, where G = 6.67 x 10^{-11}
   Declare all variables as doubles or floats
   $C = \sqrt{(a^2 + b^2 - 2ab\cos C)}$, (a,b,c and C are doubles, hint use cmath, sqrt and the cosine function)

8. Deduce the meaning of each line of code (you may write a program to help you)

```
double x=2.5;
double y=-1.5;
int m = 18;
int n=4;
string s = "Hello"; //I know I have not discussed strings
string t = "World";
```

(a) x+n*y-(x+n)*y
(b) m/n+m%n
(c) 5*x-n/5
(d) sqrt(sqrt(n))
(e) s+t;
(f) s+n
(g) 1-(1-(1-(1-(1-n))))
(h) s.substr(1,2)
(i) s.length() + t.length (these are ints)

9. Write a program that prints the following

1
10
100
1000
10000
100000
1000000
10000000
100000000
1000000000
10000000000
100000000000

10. Write a program that writes the squares, cubes and fourth powers of the integers from 1 to 5 inclusive.

11. Write a program that prompts the user for two integers and then prints
    the sum
    the difference
    the product
    the average
    the distance in absolute value between the two (use abs(x) in cmath)
    the maximum of the two
    the minimum of the two