Chapter 6 Homework

Reading Assignment:
Read Chapter 6 in <u>Introduction to Programming with C++</u>, 3rd Edition by Liang

Problem Assignment:
For each program turn in a printout of the main program, any functions, and the output for all test cases indicated. In general, you don't need to protect against illegal inputs for homework problems unless specifically noted. Use the standard TCC template.
<u>Format when using functions:</u>
Include a prototype (function declaration) before main and show all functions after main.
Include comments at the beginning of all functions describing the function.

1. (12 pts) <u>Checkpoint Exercise 6.22 on p. 236 (all 4 parts)</u>: Work each problem by hand (not using the compiler). ***Be sure to write out the instructions for each problem and include the given information.***

2. (13 pts) <u>Function with one return value:</u> Write a C++ program for Programming Exercise 6.2 on page 252. Test the program for integers with 1, 3, 5, and 7 digits.

3. (13 pts) <u>Functions with one return value</u>: Write a C++ program for Programming Exercise 6.8 on page 253. The table produced should be shown exactly as in the text (use left justification for each column, use the number of digits after the decimal point in each column, show trailing zeros, etc)

4. (13 pts) <u>Function with no return values:</u>
    Write a C++ program for Programming Exercise 6.11 on page 254.
    Test the program for the following cases:
    A) All upper case letters   B) All lower case letters   C) All characters from '1' to 'z'

5. (14 pts) <u>Reference Parameters (functions with multiple output values)</u>: Write a C++ function that when given the 3 sides of a triangle it will return the three angles (in degrees). Additionally, write a main program that:
    * Prompts the user to enter the 3 sides (assume that valid values are entered for this exercise)
    * Calls the function
    * Displays the three angles (include the unit degrees)
    Test the program for the following cases:
    A) 3, 4, 5   B) 4, 4, 4   C) 3, 4, 6

6. (13 pts) <u>Reference Parameters (functions with multiple output values)</u>: Write a C++ function that when given a string, the function will return the number of vowels, the number of consonants, and the number of other characters in the string. Also write a main program that:
    * Prompts the user to enter a string (use getline() to read the string)
    * Calls the function
    * Displays the number of vowels, the number of consonants, and the number of othe characters
    Test the program for the following cases:
    A) John Doe   (Result: 3 vowels, 4 consonants, 1 other)
    B) 12 inches = 1 foot   (Result: 4 vowels, 6 consonants, 8 other)
    C) Your name
    D) A sentence with at least 5 words

7. (22 pts) Determine the output for each part below by hand (do not compile the programs). You can simply fill out and turn in this page.

```cpp
// Problem 5A
#include <iostream>
#include <cmath>
using namespace std;
double Square(double);   // Function declaration
double Cube(double);     // Function declaration

int main ( void )
{ double x = 2.0, y = 3.0;
  x = Square(x);
  y = Cube(x);
  cout << "x = " << x << endl;
  cout << "y = " << y << endl;
  return 0;
}
// Function definitions
double Square(double y)
{    double x = pow(y,2);
     return x;}
double Cube(double x)
{    double y = pow(x,3);
     return y;}
```

x = _____

y = _____

```cpp
// Problem 5B
#include <iostream>
#include <cmath>
using namespace std;
void F2(int,int,int,int&,int&,int&);  // Function declaration

int main ( void )
{ int X=1,Y=2,Z=3,A=4,B=5,C=6,A1=7,A2=8,A3=9;
  F2(X,Y,Z,A,B,C);
  cout << "X = " << X << "  Y = " << Y << endl;
  cout << "Z = " << Z << "  A = " << A << endl;
  cout << "B = " << B << "  C = " << C << endl;
  cout << "A1 = " << A1 << "  A2 = " << A2 << endl;
  cout << "A3 = " << A3 << endl;
  return 0;
}
// Function definition
void F2(int X, int Y, int Z, int& A1, int& A2, int& A3)
{  X = X+5;
   A1 = A1*A1;
   A2 = (Y + Z)/2;
   A3 = (Y - Z)/2;
   return;
}
```

X = _____

Y = _____

Z = _____

A = _____

B = _____

C = _____

A1 = _____

A2 = _____

A3 = _____