CS 2250 Programming Assignment #2
Operators and Statements

Program #1

Write a program named temperature.c (or temperature.cpp if using the IDE) that:
1. prompts for and reads in a temperature
2. converts the input temperature from Fahrenheit to Celsius and prints the result to the console
3. converts the input temperature from Celsius to Fahrenheit and prints the result to the console
Note: the program only reads one value: The first calculation converts the input value from Fahrenheit to Celsius, while the second calculation converts the input value from Celsius to Fahrenheit. Reading input from the console will be demonstrated in class.

The case study presented in section 2.6 (pp. 86-89) develops part of this program and you may freely use this code. However, use type “double” rather than type “float.” (The reason for this is that C converts floats to doubles when it performs floating point arithmetic and it is easier to go along with the system when floats are not needed.)

Program #2

Write a program named cone.c (or cone.cpp) that:
4. prompts for and reads in a radius
5. prompts for and reads in a height
6. calculates and prints the volume of a right cone: \( v = \frac{1}{3} \pi r^2 h \)
7. calculates and prints the total surface area (base + cone): \( S = \pi r^2 + \pi \sqrt{r^2 + h^2} \)

The math header file <math.h> defines a symbolic constant for \( \pi \): M_PI. The Microsoft compiler requires a non-standard definition before math constants may be used:

```c
#define _USE_MATH_DEFINES /* Microsoft only */
#include <stdio.h>
#include <math.h>
```

The math function library includes a function named sqrt to calculate square roots; for example:

```c
y = sqrt(x);
```

You may use the pow function (included in the math library and demonstrated in class) to square the values in the above formulas; however, for squares and cubes, it’s just about as easy to multiply the numbers by themselves: `radius * radius`.

Program Submission and Grading

Upload temperature.c(pp) and cone.c(pp) to WebCT for grading. Follow the upload instructions on the class web page.