Selected Math Library Functions

The following are declared in <math.h> (for C) or <cmath> (for C++)

double exp(double x)
returns the value of e raised to the x power

double log(double x)
returns natural log of x; x must be zero or positive

double log10(double x)
returns base-10 log of x; x must be zero or positive

double pow(double x, double y)
returns the value of x raised to the y power
Note: to square a number, multiply it by itself:
x_sqd = x * x;
This is much faster! The pow function calculates and uses logarithms, and does not check for the power being a small integer.

double sqrt(double x)
returns square root of x; x must be zero or positive

double cos(double x)
returns cosine of x

double sin(double x)
returns sine of x

double tan(double x)
returns tangent of x

double acos(double x)
returns arc cosine of x

double asin(double x)
returns arc sine of x

double atan(double x)
returns arc tangent of x

double atan2(double x, double y)
returns arc tangent of y/x

double ceil(double x)
returns smallest floating point integer greater than or equal to x

double floor(double x)
returns largest floating point integer less than or equal to x

double fabs(double x)
returns absolute value of x

long labs(long x)
returns absolute value of x

double fmod(double x, double y)
returns the remainder of x/y - this is the double analog to the modulo operator '%' which is only defined for integers.
examples:

```
fmod( 13, 12 ) is 1
fmod( 13.5, 12 ) is 1.5
fmod( 13.5, 12.5 ) is 1
fmod( 20, 2.5 ) is 0
fmod( 22, 2.5 ) is 2
```

If you have a Standard-compliant C++ implementation,the following overloaded functions are also declared in <cmath>:

double abs(double x);
returns the absolute value of a double parameter as a double.
A more intuitively-named replacement for fabs (see above). Note that abs for integers is declared in stdlib/cstdlib (see below).

double pow(double x, int y);
like pow but with an integer power argument - possibly more efficient, depending on the implementation

The following are declared in <stdlib.h> (for C) or <cstdlib> (for C++)

int abs(int x)
returns absolute value of x
Important: See above for fabs and abs for double type.

int rand()
returns a pseudo-random integer in 0...largest value in type int

To generate a random number x between 0 and one, divide the value returned by rand() by the macro RAND_MAX (notice both are integers). RAND_MAX gives the largest possible value returned by rand().

```
const double rand_max = RAND_MAX;

double x = rand()/rand_max;
```

void srand(int seed)
initializes random number generator
If not used, the initial seed is 1. Use srand to specify another seed.

NOTES

Check a C library reference manual (such as Harbison & Steele) for details of these functions, the legal values of the arguments, and the possible error behavior of each.

The C++ ANSI Standard requires that all math functions with floating point argument(s) be defined for float, double, and long double values by overloading the function definitions; your compiler and library may or may not be up to Standard.