CECS 174 – Lecture 7 – Math Library

The Math Class -

http://docs.oracle.com/javase/6/docs/api/ -> Math

Similar to the methods available to the String class, the Math class has a great deal of mathematical functions available. The Math class is automatically included, so there is no need to import the Math class. Here are just a few of its methods and what they do:

Math.sqrt(double x)	Returns the square root of x (for x>0).
Math.pow(double x, double y)	Returns the value of x raised to the power of y.
Math.round(double x)	Returns the nearest integer to x.
Math.toRadians(double deg)	Converts degrees to radians.
Math.toDegrees(double rad)	Converts radians to degrees.
Math.sin(double x)	Returns the sine of x (in radians).
Math.asin(double x)	Returns the inverse sine of x (in radians)
Math.cos(double x)	Returns the cosine of x (in radians).
Math.tan(double x)	Returns the tangent of x (in radians).
Math.log(double x)	Return the natural log of x.
Math.random()	Returns a random double value between 0.0 and 1.0
Math.PI	Returns the constant value π.

Examples:
```
//square root of 4
double val = Math.sqrt(4.0); //2.0

//power - 2^3
double val1 = Math.pow(2.0, 3.0);   // 8.0

//area of a circle
double radius = 4.0;
double area = Math.PI * Math.pow(radius, 2.0); //50.2654

//sine of 45 degrees
double degrees = 45.0;
double radians = Math.toRadians(degrees); //0.78539816
double sine = Math.sin(radians);   //0.70710678

//log of 10
double val2 = Math.log(10.0); //1.0

//random number
System.out.println(Math.random()); //0.48004648

//pi
System.out.println(Math.PI); //3.14159265
```

CECS 174 - Lecture 7 Worksheet -

Use the Math Class functions to create the code necessary to compute the appropriate value using each of the following equations.

1. Area of a sphere - $\dfrac{4}{3}\pi r^3$

   ```
   double radius = in.nextDouble();

   double area = _____
   ```

2. Hypotenuse of a triangle - $c^2 = a^2 + b^2$

   ```
   double a = in.nextDouble();
   double b = in.nextDouble();

   double c = _____
   ```

3. Quadratic Equation - $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, just solve for the positive root.

   ```
   double a = in.nextDouble();
   double b = in.nextDouble();
   double c = in.nextDouble();

   double x = _____
   ```

4. Law of Cosines - $c^2 = a^2 + b^2 - 2ab\cos C$, where a, b, and c are the sides of a triangle and C is the angle opposite of side c.

   ```
   double a = in.nextDouble();
   double b = in.nextDouble();
   double angleCinDeg = in.nextDouble();

   double angleCinRad = _____

   double c = _____
   ```

5. Sine Function - $\sin A = \dfrac{a}{c}$, where a and c are two sides of a right triangle and A is the angle opposite of side a.

   ```
   double a = in.nextDouble();
   double c = in.nextDouble();

   double angleAinRad = _____

   double angleAinDeg = _____
   ```