



# Object Oriented Programming Lab CSE 1206

LAB 3



## **Course Teacher**

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# Some Built-in classes and their uses

## ► MATH class

Link 1: <https://www.javatpoint.com/java-math>

Link 2:

<http://tutorials.jenkov.com/java/math-operators-and-math-class.html#the-java-math-class>

Example:

```
public class TestMath{  
    public static void main(String[] args) {  
        int x = 25;  
        System.out.println(Math.sqrt(x));  
    }  
}
```

# Access Modifier: **public**

	<b>public</b>
<b>Class</b>	<b>Yes</b>
<b>Fields/ variables</b>	<b>Yes</b>
<b>Methods</b>	<b>Yes</b>
<b>Constructors</b>	<b>Yes</b>

# Task:

1. Create a Project Named: **ShapeDemo**
2. Create a new class within the same package named: **Circle**
3. Declare two public variables:
  - **radius : double**
  - **color : String**
4. Declare a default empty constructor.
5. Declare another constructor and pass parameters as (**double radius, String color**)
6. Create a method named **calculateArea()** which return the area in datatype double.

For value of PI use= **Math.PI**

# Task:

7. In the ShapeDemo class Declare an object of Circle class.
8. Assign values radius = 12 , color =“green” using constructors.
9. Call the method **calculateArea()** using the object.
10. Print the color variable and the area.
11. Assign value of color =“blue” using the object to the variable color and print it.

```
package shapedemo;
public class Circle {

    public double radius;
    public String color;

    public Circle() {

    }
    public Circle(double radius, String color)
    {
        this.radius=radius;
        this.color=color;
    }
    public double getArea() {
        return radius*radius*Math.PI;
    }
}
```

```
package shapedemo;
```

```
public class ShapeDemo {
```

```
    public static void main(String[] args) {
```

```
        Circle myCircle = new Circle(12, "green");
```

```
        System.out.println("Color is = " + myCircle.color);
```

```
        System.out.println("Area is = " + myCircle.getArea());
```

```
        myCircle.color="blue";
```

```
        System.out.println("Changed Color is = " + myCircle.color);
```

```
    }
```

```
}
```



# Access Modifier: **private**

	<b>private</b>
<b>Class</b>	<b>Mostly NO</b> (can be declared in some cases)
<b>Fields/ variables</b>	<b>Yes</b>
<b>Methods</b>	<b>Yes</b>
<b>Constructors</b>	<b>Yes</b>

```
package shapedemo;
public class Circle {

    private double radius;
    private String color;

    private Circle() {

    }

    private Circle(double radius, String color)
    {
        this.radius=radius;
        this.color=color;
    }

    private double getArea() {
        return radius*radius*Math.PI;
    }

}
```

Will Give Error in ShapeDemo  
when object is created.  
Because Private constructors,  
methods and variables  
are not accessible.

```
package shapedemo;

public class Circle {

    private double radius;
    private String color;

    public Circle() {

    }

    public Circle(double radius, String color)
    {
        this.radius=radius;
        this.color=color;
    }

    public double getArea() {
        return radius*radius*Math.PI;
    }

}
```

```
package shapedemo;
```

Private variable Color gives error

```
public class ShapeDemo {
```

```
    public static void main(String[] args) {
```

```
        Circle myCircle = new Circle(12, "green");
```

```
        System.out.println("Color is = " + myCircle.color);
```

```
        System.out.println("Area is = " + myCircle.getArea());
```

```
        myCircle.color="blue";
```

```
        System.out.println("Changed Color is = " + myCircle.color);
```

```
    }
```

```
}
```



Solution: Getter and Setter



```
package shapedemo;

public class Circle {

    private double radius;
    private String color;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    public String getColor() {
        return color;
    }

    public void setColor(String color) {
        this.color = color;
    }
}
```

```
package shapedemo;
```

```
public class ShapeDemo {
```

```
    public static void main(String[] args) {
```

```
        Circle myCircle = new Circle(12, "green");
```

```
        System.out.println("Color is = " + myCircle.getColor());
```

```
        System.out.println("Area is = " + myCircle.getArea());
```

```
        myCircle.setColor("blue");
```

```
        System.out.println("Changed Color is = " + myCircle.getColor());
```

```
    }
```

```
public void setRadius (double radius) {  
  
    if (radius == 0 ) {  
  
        this.radius = 1;  
    }  
    else if (radius > 0 ) {  
  
        this.radius = radius;  
    }  
  
}
```



```
public class ShapeDemo {
```

```
    public static void main(String[] args) {
```

```
        Circle myCircle = new Circle();
```

```
        myCircle.setRadius(0);
```

```
        System.out.println("Area is = " + myCircle.getArea());
```

```
        myCircle.setRadius(15);
```

```
        System.out.println("Area is = " + myCircle.getArea());
```



# Objects As Parameters in Methods

```
package shapedemo;

public class Circle {

    private double radius;
    private String color;

    boolean testObject(Circle circleObj) {

        return (radius == circleObj.radius && color == circleObj.color);
    }
}
```

```
public class ShapeDemo {  
  
    public static void main(String[] args) {  
  
        Circle myCircle1 = new Circle(100, "red");  
        Circle myCircle2 = new Circle(100, "red");  
  
        System.out.println("Are Values Equal: " + myCircle1.testObject(myCircle2));  
    }  
}
```

# Practice Problem

## Rectangle

-length:float = 1.0f

-width:float = 1.0f

+Rectangle()

+Rectangle(length:float,width:float)

+getLength():float

+setLength(length:float):void

+getWidth():float

+setWidth(width:float):void

+getArea():double

+getPerimeter():double

+toString():String

"Rectangle[length=?,width=?]"

```
public String toString() {  
    return "Rectangle[length=" + length + " width=" + width + "];"  
}
```