CIS 1068
Worksheet 8

Instructions: This lab will test your knowledge of equals(), setter and getter methods. The program does not take any user input.

Create a project called ShapeChecker. It will contain 3 classes; the main class ShapeChecker, and two other classes ShapeType, and Shape

1. Create an ENUM class named ShapeType in its own .java file as follows:

```java
public enum ShapeType {
    RECTANGLE, TRIANGLE, CIRCLE
}
```

2. Create a class called Shape described below:

   It will contain 4 instance variables:
   ```java
   private ShapeType type - The type of shape
   private double base - The base of the shape (if any)
   private double height - The height of the shape (if any)
   private double diameter - The diameter of the shape (if any)
   ```

   Create getters and setters for each instance variable – The setters for base and height should only set their value if the type is already set to ShapeType.RECTANGLE or ShapeType.TRIANGLE. They should print an error message otherwise. The setter for diameter should only set its value if type is already set to ShapeType.CIRCLE. It should print an error message otherwise.

   Additionally, create the following 2 methods:

   ```java
   public double getArea() - Return the area of the shape based on the type:
   Rectangle: Base * Height
   Triangle: 1/2 Base * Height
   Circle: PI * (1/2 Diameter)^2
   ```

   ```java
   public boolean equals(Shape otherShape) - Returns true if the areas of the shapes are within 50 untils of each other(for example, if shape1.getArea() returns 110, and shape2.getArea() returns 115, these should be considered equal, regardless of what the shape type is. It should use the getArea() methods of the shape objects when comparing their areas.
   ```
3. In the main method of **ShapeChecker** do the following:

   1. Create 3 objects of type **Shape**, shape1, shape2, and shape3

   2. Set the following values for each shape object:
      1. shape1: \[\text{type} = \text{ShapeType.RECTANGLE} \]
         \[\text{base} = 50\]
         \[\text{height} = 20\]
      2. shape2: \[\text{type} = \text{ShapeType.TRIANGLE} \]
         \[\text{base} = 80\]
         \[\text{height} = 24\]
      3. shape3: \[\text{type} = \text{ShapeType.CIRCLE} \]
         \[\text{diameter} = 36\]

   3. Using the **equals()** method of shape1, check if it is equal to shape2 and print a message saying if it is or is not

   4. Do the same for shape2 and shape3, and shape1 and shape3

   5. Run your main method and show your work to the TA to receive a grade