1.

interface Shape {

double calculateArea();

double calculatePerimeter();

}

class Circle implements Shape {

private double radius;

public Circle(double radius) {

this.radius = radius;

}

public double getRadius() {

return radius;

}

public void setRadius(double radius) {

this.radius = radius;

}

@Override

public double calculateArea() {

return Math.PI \* radius \* radius;

}

@Override

public double calculatePerimeter() {

return 2 \* Math.PI \* radius;

}

}

class Rectangle implements Shape {

private double width;

private double height;

public Rectangle(double width, double height) {

this.width = width;

this.height = height;

}

public double getWidth() {

return width;

}

public void setWidth(double width) {

this.width = width;

}

public double getHeight() {

return height;

}

public void setHeight(double height) {

this.height = height;

}

@Override

public double calculateArea() {

return width \* height;

}

@Override

public double calculatePerimeter() {

return 2 \* (width + height);

}

}

class Triangle implements Shape {

private double base;

private double height;

public Triangle(double base, double height) {

this.base = base;

this.height = height;

}

public double getBase() {

return base;

}

public void setBase(double base) {

this.base = base;

}

public double getHeight() {

return height;

}

public void setHeight(double height) {

this.height = height;

}

@Override

public double calculateArea() {

return 0.5 \* base \* height;

}

@Override

public double calculatePerimeter() {

return base + 2 \* height;

}

}

public class Shapeobj {

public static void main(String[] args) {

// Create a circle

double radius = 5.0;

Circle circle = new Circle(radius);

System.out.println("Circle area: " + circle.calculateArea());

System.out.println("Circle perimeter: " + circle.calculatePerimeter());

// Create a rectangle

double width = 10.0;

double height = 20.0;

Rectangle rectangle = new Rectangle(width, height);

System.out.println("Rectangle area: " + rectangle.calculateArea());

System.out.println("Rectangle perimeter: " + rectangle.calculatePerimeter());

// Create a triangle

double base = 15.0;

double height = 10.0;

Triangle triangle = new Triangle(base, height);

System.out.println("Triangle area: " + triangle.calculateArea());

System.out.println("Triangle perimeter: " + triangle.calculatePerimeter());

}

}