Week 5 Homework Quiz 3

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# Author Note

# The Question

Cylinder

1. Create a class for Cylinder.

2. The class should have member functions:

\* A constructor (i.e., manager function)

\* One get function for each data member

\* One set function for each data member

\* A helping function pi()

The function will be used to calculate the volume and

the area of the cylinder.

\* A predicate function to answer this question:

(1) Is a cylinder a disk?

Note: Assuming that a cylinder is a disk

if the height of the cylinder is 1.

\* Two implementor functions

- float volume()

This function returns the volume of a cylinder.

- float area()

This function returns the area of a cylinder.

3. Test this class by creating one object, cup, in main().

4. Display the content of the object in main()

5. Check whether the cup is a disk.

6. Display the volume and area of the object cup.

attributes of a cylinder:

     int radius

    int height

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Cylinder's volume

= pi \* radius \* radius\* height

Cylinder's area

= 2 \* pi \*  radius \* radius

  + 2 \* pi \* radius \* height

A screenshot of a computer program

Description automatically generated

The Source Code

public class Cylinder {

    // Data members

    private int radius;

    private int height;

    // Constructor

    public Cylinder(int radius, int height) {

        this.radius = radius;

        this.height = height;

    }

    // Getters and setters for radius and height

    public int getRadius() {

        return radius;

    }

    public void setRadius(int radius) {

        this.radius = radius;

    }

    public int getHeight() {

        return height;

    }

    public void setHeight(int height) {

        this.height = height;

    }

    // Helper function to calculate pi

    private int pi() {

        return 3;

    }

    // Predicate function to check if the cylinder is a disk

    public boolean isDisk() {

        return height == 1;

    }

    // Implementor functions

    public int volume() {

        return pi() \* radius \* radius \* height;

    }

    public int area() {

        int lateralSurfaceArea = 2 \* pi() \* radius \* height;

        int baseArea = 2 \* pi() \* radius \* radius;

        return lateralSurfaceArea + baseArea;

    }

    public static void main(String[] args) {

        // Create a Cylinder object named "cup"

        Cylinder coster = new Cylinder(5, 1);

        // Display the content of the object

        System.out.println("Cylinder Properties:");

        System.out.println("Radius: " + coster.getRadius());

        System.out.println("Height: " + coster.getHeight());

        // Check if the cup is a disk

        if (coster.isDisk()) {

            System.out.println("The cup is a disk.");

        } else {

            System.out.println("The cup is not a disk.");

        }

        // Display the volume and area of the cup

        System.out.println("Volume: " + coster.volume());

        System.out.println("Surface Area: " + coster.area());

    }

}