

Assignment: Writing class Geometry©2025 Chris Nielsen – www.nielsenedu.com

1. Take your `UsingMath`, and separate out the geometry-related methods into a separate class named `Geometry`. So that we can keep our `UsingMath` code undisturbed, also make a `UsingGeometry` that will call the `Geometry` class methods. Here are the steps to follow:
 - Create a class named `Geometry` – do not include a `main` method in this class!
 - Move all geometry-related methods from `UsingMath` into the `Geometry` class. (The methods `calculateCircumference` and `calculateCircleArea`).
 - Create a class name `UsingGeometry`. Include a `main` method in this class.
 - Copy the code from the `main` method of `UsingMath` into the `main` method of the `UsingGeometry`. Delete the methods `calculateCircumference` and `calculateCircleArea` from the `UsingGeometry` class code.
 - At this point, the `UsingGeometry` will not know to find the methods `calculateCircumference` nor `calculateCircleArea` in the `Geometry` class. To let the compiler know which class to find these methods, put “`Geometry.`” in front of each of these methods. Note that this is similar to how we call `Math` class methods – using the class name and a period in front of the method name, such as: `Math.sqrt(2)`.
 - Run your `UsingGeometry` and confirm the output is the same as it was for the `UsingMath`. Here is the expected output of `UsingMath`:

```
The value of pi is: 3.141592653589793
The circumference of a circle of radius 5.0 is equal to 31.41592653589793.
The area of a circle of radius 5.0 is equal to 78.53981633974483.
```

2. To your `UsingGeometry` class, add the functionality to calculate the hypotenuse length of a right-angle triangle.
 - Create a new method named `hypotenuseLength` in the `Geometry` class. This method should take two parameters of type `double` that represent the two legs of a right-angle triangle. It should also return a `double` value that is the calculated hypotenuse length using the formula: $h = \sqrt{a^2 + b^2}$.
 - Create a new method named `printHypotenuseLength` in the `UsingGeometry` class. This method should take two parameters of type `double` that represent the two legs of a right-angle triangle, and print, when called with parameter values 3.0 and 4.0, exactly the output (with or without the line wrapping):

```
A right-angle triangle with side lengths of 3.0 and 4.0 has a hypotenuse
length of 5.0.
```

The complete and final output of the program is shown here.:

```
The value of pi is: 3.141592653589793
The circumference of a circle of radius 5.0 is equal to 31.41592653589793.
The area of a circle of radius 5.0 is equal to 78.53981633974483.
A right-angle triangle with side lengths of 3.0 and 4.0 has a hypotenuse
length of 5.0.
```

After coding and testing your solution, copy your working code from each class into the appropriate box on the following page.

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After coding and testing your solution, copy your working code from each class into the appropriate box below.

```
// class Geometry
```

```
public class Geometry {  
    public static double calculateCircumference(double radius) {  
        return 2 * Math.PI * radius;  
    }  
    public static double calculateCircleArea(double radius) {  
        return Math.PI * radius * radius;  
    }  
    public static double hypotenuseLength(double x, double y) {  
        return Math.sqrt(x*x + y*y);  
    }  
}
```

```
// class UsingGeometry
```

```
public class UsingGeometry {  
    public static void main(String args[]) {  
        System.out.println("The value of pi is: " + Math.PI);  
        printCircumference(5.0);  
        printCircleArea(5.0);  
        printHypotenuseLength(3.0, 4.0);  
    }  
    public static void printCircumference(double radius) {  
        double circumference =  
            Geometry.calculateCircumference(radius);  
        System.out.println("The circumference of a circle of radius " +  
            radius + " is equal to " + circumference + ".");  
    }  
    public static void printCircleArea(double radius) {  
        double area = Geometry.calculateCircleArea(radius);  
        System.out.println("The area of a circle of radius " +  
            radius + " is equal to " + area + ".");  
    }  
    public static void printHypotenuseLength(double a, double b) {  
        double hypotenuse = Geometry.hypotenuseLength(a, b);  
        System.out.println("A right-angle triangle with side lengths of " +  
            a + " and " + b + " has a hypotenuse length of " +  
            hypotenuse + ".");  
    }  
}
```