*Experiment No.*_____ *Date*___/___/*22*

TITLE OF EXPERIMENT: - A Program to calculate area of triangle, area of rectangle and area of circle.

DIVISION:_____ **BRANCH:** _____

BATCH:_____ **ROLL NO.:** _____

PERFORMED ON DATE: _____

SIGNATURE OF TEACHING STAFF:

EXPERIMENT NO. 2

Aim: Write a JavaScript program to calculate area of triangle, area of rectangle and area of circle.

Prerequisites:

- For this **Javascript Lab**, it is assumed that you have a prior knowledge of HTML coding. It would help if you had some prior exposure to object-oriented programming concepts and a general idea on creating online applications.
- To understand this experiment, you should have the knowledge of the basic **JavaScript, Javascript operators, javascript Math sqt().**

Editor:

1.	NotePad
2.	Visual studio code

Theory:

A) Area of triangle :

The **area of a triangle** is defined as the total space occupied by the three sides of a triangle in a 2-dimensional plane.
The area of a triangle can be calculated using various methods. In this expt., we will be calculating the area using two different approaches.

These two methods are as follows:-

1. Using **Base** and **Height** of the Triangle
2. Using the **Sides** of the Triangle

Case 1: If you know the base and height of a triangle, you can find the area using the formula:

```
area = (base * height) / 2
```

Example 1: <u>Area When Base and Height is Known</u>

```
//JavaScript Program To Calculate The Area of a Triangle

var base = parseInt(prompt("Enter the base: "));

var height = parseInt(prompt("Enter the height: "));

//Calculating the area

var area = (base * height) / 2;

//Display Output

console.log("Base: " + base);

console.log("Height: " + height);

console.log("The area of the triangle is " + area);
```

Output

```
Base: 3
Height: 4
The area of the triangle is 6
```

How Does This Program Work?

```
var base = parseInt(prompt("Enter the base: "));
var height = parseInt(prompt("Enter the height: "));
```

1) The user is asked to enter the value of **base** and **height** of the triangle.

```
//Calculating the area
var area = (base * height) / 2;
```

2) Then, we calculate the area of the triangle using **½ x Base x Height**.

```
//Display Output
console.log("Base: " + base);
console.log("Height: " + height);
console.log("The area of the triangle is " + area);
```

3) Finally, the area of the triangle is printed on the screen using **console.log()** function.

OR

```
const baseValue = prompt('Enter the base of a triangle: ');
const heightValue = prompt('Enter the height of a triangle: ');

// calculate the area
const areaValue = (baseValue * heightValue) / 2;

console.log(
  `The area of the triangle is ${areaValue}`
);
```

Output

```
Enter the base of a triangle: 4
Enter the height of a triangle: 6
The area of the triangle is 12
```

Case 2: If you know all the sides of a triangle, you can find the area using Herons' formula. If a, b and c are the three sides of a triangle, then

$$s = (a+b+c)/2$$

$$area = \sqrt{(s(s-a)*(s-b)*(s-c))}$$

Example 2: <u>Area When All Sides are known</u>

```
// JavaScript program to find the area of a triangle


const side1 = parseInt(prompt('Enter side1: '));
const side2 = parseInt(prompt('Enter side2: '));
const side3 = parseInt(prompt('Enter side3: '));

// calculate the semi-perimeter
const s = (side1 + side2 + side3) / 2;

//calculate the area
const areaValue = Math.sqrt(s * (s - side1) * (s - side2) * (s - side3));

console.log(`The area of the triangle is ${areaValue}`);
```

1) We calculate the semi-perimeter of the triangle using **s = (a + b + c) / 2**.

```
var area = Math.sqrt(s * (s - first_side) * (s - second_side) * (s - third_side));
```

2) Then, we calculate the area of the triangle using the formula:

Area = [s((s-a)(s-b)(s-c))]½**

3) The **Math.sqrt()** method is used to calculate the square root of the number.

```
console.log("Area: " + area);
```

4) Finally, the area of the triangle is printed on the screen using the **console.log()** method.

Output

```
Enter side1: 3
Enter side2: 4
Enter side3: 5
The area of the triangle is 6
```

B) To Calculate Area Of Rectangle :

The process to calculate area of a rectangle is very easy when you know the formula for the area of a rectangle. The space within the perimeter of the rectangle is an area of the rectangle.

Formula:

$a = l * w$

where:

a = area of rectangle

l = length of the rectangle

w = width of the rectangle

- By multiplying the length and width area of a rectangle is calculated.
- Functions need to be called before they can execute. That is because, area is a function in JavaScript code that you hold, so you need to *call it*, and you also need to pass the parameters to it.

```
<script type="text/javascript">
```

```
/*
   Javascript program to find the area of a rectangle
*/

   var l, w, a;
   l = 8;
   w = 6;

   /* Calculate area of rectangle */
   a = l * w;

   document.write("Area of rectangle = " + a + " units");

</script>
```

Output Screen:

```
Area of rectangle = 48 units
```

OR

```
<script>

// Javascript program to find area of rectangle


// Utility function
function areaRectangle(width, length)
{
        let area = width * length;
        return area;
}


// Driver program

let width = 5;
let length = 6;
document.write("Area = " + areaRectangle(width, length) + "<br>");

</script>
```

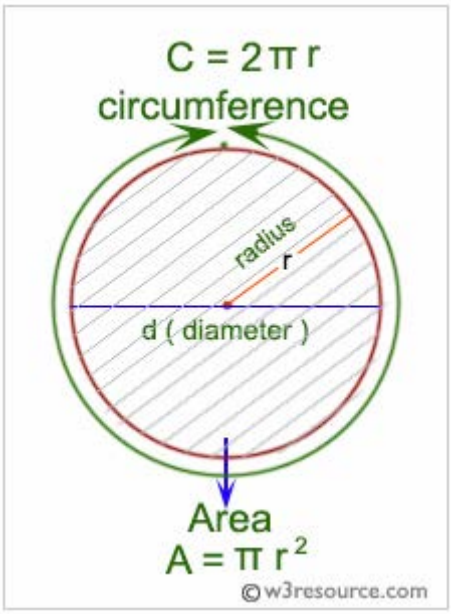
Output

```
Area = 30
```

C) To Calculate Area Of Circle:

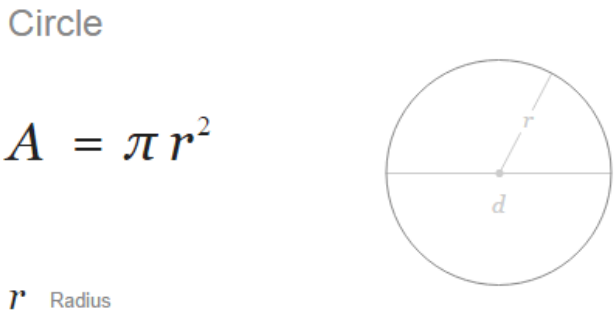
In geometry, the area enclosed by a circle of radius r is πr2. Here the Greek letter π represents a constant, approximately equal to 3.14159, which is equal to the ratio of the circumference of any circle to its diameter.

The circumference of a circle is the linear distance around its edge.



We use the following mathematical formula for calculating area of the circle In JavaScript:

Area of Circle= radius * radius * PI
circumference of the circle = 2 * radius * PI



Where, *radius* is the radius of the circle, &

PI is the constant value of the pi.

Approach: First we will create three input fields using <input type=”number”> tag to holds number input. After filling the input value, when user click the button, then the JavaScript function Area() will be called.

In JavaScript function, we use **document.getElementById("side1").value** to get the input value and then apply **parseInt()** method on it to get the input value in number. And then use simple mathematical formula to find the area of circlr and use **document.getElementById("display").innerHTML** to display the output on the screen.

```
<html>
<head>
<title> JavaScript Program To Calculate The Area of a Circle </title>
</head>
<body>
   <h1>Area of a circle</h1>
   Enter the radius for your circle:
   <input type="text" id="txtRadius" />
   <input type="button" value="Calculate" onClick=CalculateArea() />
   <script>
      function CalculateArea() {
         var radius = document.getElementById('txtRadius').value;
         alert("The area of the circle is " + (radius * radius * Math.PI));
      }
   </script>
</body>
</html>
```

Program:

A) To Calculate Area Of Triangle

```
<html>
<head>
```

```
<title> JavaScript Program To Calculate The Area of a Triangle </title>
</head>
<body>
<script>
// enter the value of base and height of the triangle
const baseValue = prompt('Enter the base of a triangle: ');
const heightValue = prompt('Enter the height of a triangle: ');
// calculate the area
const areaValue = (baseValue * heightValue) / 2;
//Display Output
console.log(`The area of the triangle is ${areaValue}`);
</script>
</body>
</html>
```

B) To Calculate Area Of Rectangle

```
<html>
<head>
<title> JavaScript Program To Calculate The Area of a Rectanble </title>
</head>
<body>
<script type="text/javascript">
/*
   Javascript program to find the area of a rectangle
*/
   var l, w, a;
   l = 8;
   w = 6;
     /* Calculate area of rectangle */
   a = l * w;
```

```
    document.write("Area of rectangle = " + a + " units");
</script>
</body>
</html>
```

c) To Calculate Area Of Circle:

```
<html>
<head>
<title> JavaScript Program To Calculate The Area of a Circle </title>
</head>
<body>
   <h1>Area of a circle</h1>
   Enter the radius for your circle:
   <input type="text" id="txtRadius" />
   <input type="button" value="Calculate" onClick=CalculateArea() />
   <script>
      function CalculateArea() {
         var radius = document.getElementById('txtRadius').value;
         alert("The area of the circle is " + (radius * radius * Math.PI));
      }
   </script>
</body>
</html>
```

Screenshot's of Output:

A) To Calculate Area Of Triangle

expt2 - Notepad

File Edit Format View Help

```
<html>
<head>
<title> JavaScript Program To Calculate The Area of a Triangle </title>
</head>

<body>
<script>

const baseValue = prompt('Enter the base of a triangle: ');
const heightValue = prompt('Enter the height of a triangle: ');

// calculate the area
const areaValue = (baseValue * heightValue) / 2;

console.log(
  `The area of the triangle is ${areaValue}`
);


</script>
```

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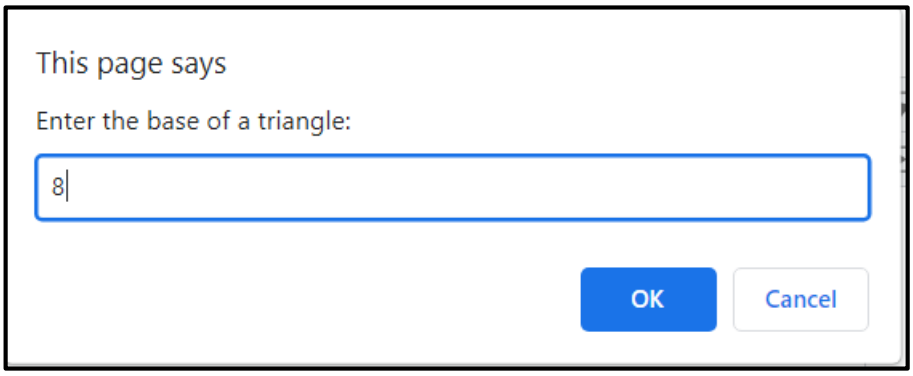
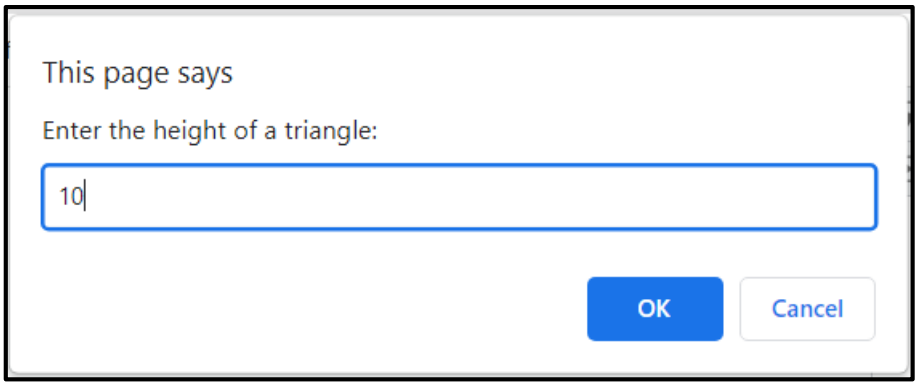
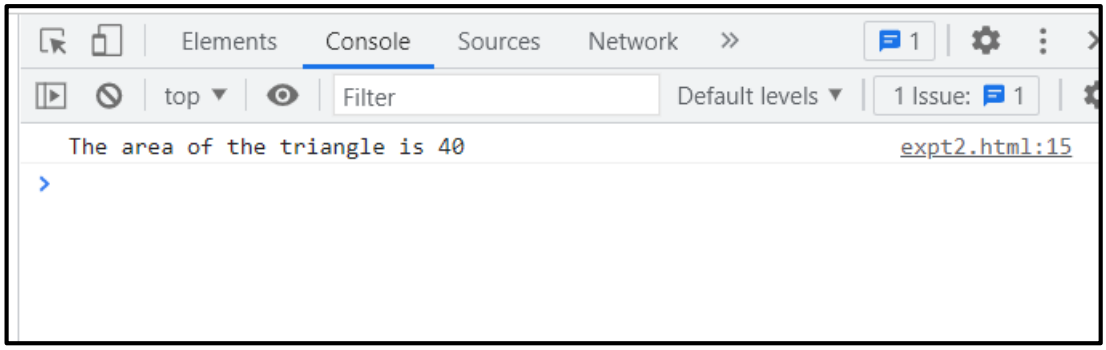
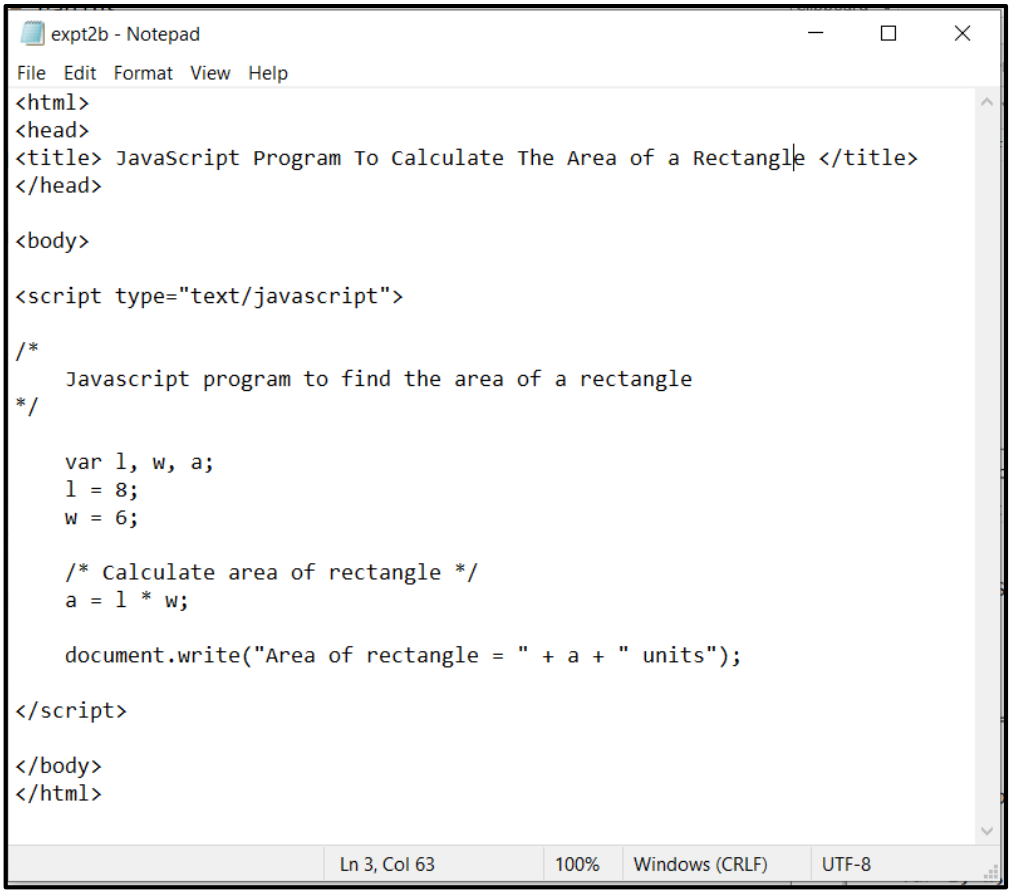
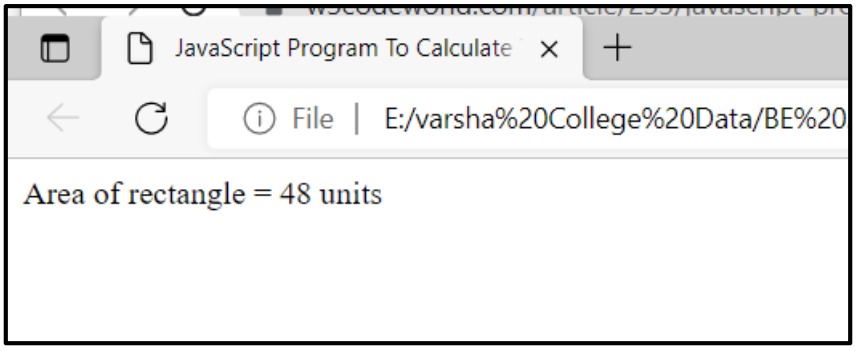






B) To Calculate Area Of Rectangle





c) To Calculate Area Of Circle:

expt2c - Notepad

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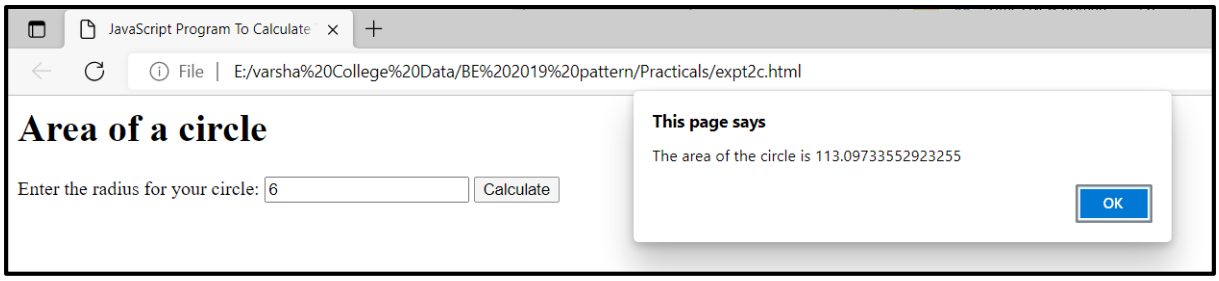
```
<html>
<head>
<title> JavaScript Program To Calculate The Area of a Circle </title>
</head>

<body>
    <h1>Area of a circle</h1>
    Enter the radius for your circle:
    <input type="text" id="txtRadius" />
    <input type="button" value="Calculate" onClick=CalculateArea() />
    <script>
        function CalculateArea() {
            var radius = document.getElementById('txtRadius').value;
            alert("The area of the circle is " + (radius * radius *
Math.PI));
        }
    </script>
</body>

</html>
```



Conclusion: