

## 7.7 JS Math and Strings



*casino slot machine - answered by Vance Cyro Jao*

### Math constants and methods

- The Javascript `Math` Object allows you to perform mathematical tasks on numbers.
  - The syntax for any Math property is : `Math.property`.

Keyword(s)	Description	Sample code	Console output
<code>Math.PI</code>	<ul style="list-style-type: none"><li>Represents the mathematical constant Pi (<math>\pi</math>).</li></ul>	<code>console.log(Math.PI);</code>	3.1415...
<code>Math.SQRT2</code>	<ul style="list-style-type: none"><li>Represents the square root of 2 (<math>\sqrt{2}</math>).</li></ul>	<code>console.log(Math.SQRT2);</code>	1.4142...
<code>Math.SQRT1_2</code>	<ul style="list-style-type: none"><li>Represents the square root of 1/2 (<math>\sqrt{1/2}</math>)</li></ul>	<code>console.log(Math.SQRT1_2);</code>	0.7071...
<code>Math.round()</code>	<ul style="list-style-type: none"><li>Rounds a number to its nearest integer.</li></ul>	<code>console.log(Math.round(4.7));</code>	5
		<code>console.log(Math.ceil(4.3));</code>	5
		<code>console.log(Math.floor(4.9));</code>	4
		<code>console.log(Math.trunc(4.8));</code>	4
		<code>console.log(Math.sign(-3));</code>	-1
		<code>console.log(Math.pow(2, 3));</code>	8
		<code>console.log(Math.sqrt(16));</code>	4
		<code>console.log(Math.abs(-5));</code>	5
<code>Math.ceil()</code>	<ul style="list-style-type: none"><li>Rounds a number up to the nearest integer.</li></ul>	<code>console.log(Math.sin(Math.PI / 2));</code>	1
		<code>console.log(Math.cos(0));</code>	1
		<code>console.log(Math.min(2, 5, 1, 8,</code>	2

<code>Math.floor()</code>	<ul style="list-style-type: none"> <li>• Rounds a number down to the nearest integer.</li> </ul>	<code>3));</code>	<code>8</code>
<code>Math.trunc()</code>	<ul style="list-style-type: none"> <li>• Returns the integer part of a number.</li> </ul>	<code>console.log(Math.max(2, 5, 1, 8, 3));</code>	<code>0.3451...</code>
<code>Math.sign()</code>	<ul style="list-style-type: none"> <li>• Returns whether a number is negative, null or positive.</li> </ul>	<code>console.log(Math.random());</code>	
<code>Math.pow()</code>	<ul style="list-style-type: none"> <li>• Returns the value of number to the power of a specified number.</li> </ul>		
<code>Math.sqrt()</code>	<ul style="list-style-type: none"> <li>• Returns the square root of a number.</li> </ul>		
<code>Math.abs()</code>	<ul style="list-style-type: none"> <li>• Returns the absolute (positive) value of a number.</li> </ul>		
<code>Math.sin()</code>	<ul style="list-style-type: none"> <li>• Returns the sine (a value between -1 and 1) of an angle (given in radians).</li> </ul>		
<code>Math.cos()</code>	<ul style="list-style-type: none"> <li>• Returns the cosine (a value between -1 and 1) of an angle x (given in radians).</li> </ul>		
<code>Math.min(),</code> <code>Math.min.apply(Math,</code> <code>number)</code>	<ul style="list-style-type: none"> <li>• Returns the lowest value in a list of arguments.</li> </ul>		
<code>Math.max(),</code> <code>Math.max.apply(Math,</code> <code>number)</code>	<ul style="list-style-type: none"> <li>• Returns the highest value in a list of arguments.</li> </ul>		
<code>Math.random()</code>	<ul style="list-style-type: none"> <li>• Returns a random number between 0 (inclusive), and 1 (exclusive).</li> </ul>		

## String properties and methods

- `String` properties and methods help you to work with strings.

Keyword(s)	Description	Sample code	Console output
<code>.length</code>	<ul style="list-style-type: none"> <li>• Returns the length of a string.</li> </ul>	<pre>const password = "abc123";  if (password.length &lt; 8) {   console.log("Weak: Password should be at least 8 characters long."); } else if (password.length &lt; 12) {   console.log("Moderate: Password is of moderate strength."); } else {   console.log("Strong: Password is strong."); }</pre>	<pre>Moderate: Password is of moderate strength.</pre>
<code>.substring()</code>	<ul style="list-style-type: none"> <li>• Extracts a part of a string and returns the extracted part in a new string.</li> </ul>	<pre>const sentence = "The quick brown fox";  const extracted_word = sentence.substring(4, 9);  console.log("Extracted word:", extracted_word);</pre>	<pre>Extracted word: quick</pre>
<code>.replace()</code>	<ul style="list-style-type: none"> <li>• Replaces a specified value with another value in a string.</li> </ul>	<pre>const sentence = "I love programming in JavaScript.";  const new_sentence = sentence.replace("JavaScript", "Python");  console.log(new_sentence);</pre>	<pre>I love programming in Python.</pre>
<code>.replaceAll()</code>	<ul style="list-style-type: none"> <li>• Replaces all instances of a specified value with another value in a string.</li> </ul>	<pre>const text = "The conference will be held on September 20, 2023. The conference will be great.";  const new_text = text.replaceAll("conference", "workshop");  console.log(new_text);</pre>	<pre>The workshop will be held on September 20, 2023. The workshop will be great.</pre>

<code>.toUpperCase()</code>	<ul style="list-style-type: none"> <li>Converts a string to upper case.</li> </ul>	<pre>const city_name = "new york city";  const cap_city_name = city_name.toUpperCase();  console.log(cap_city_name);</pre>	NEW YORK CITY
<code>.toLowerCase()</code>	<ul style="list-style-type: none"> <li>Converts a string to lower case.</li> </ul>	<pre>const user_input = "UserName123";  const lowercase_input = user_input.toLowerCase();  console.log(lowercase_input);</pre>	username123
<code>.concat()</code>	<ul style="list-style-type: none"> <li>Joins two or more strings, similar to using +.</li> </ul>	<pre>const first_name = "John"; const last_name = "Doe";  const full_name = first_name.concat( ", last_name");  console.log(full_name);</pre>	John Doe
<code>.trim()</code>	<ul style="list-style-type: none"> <li>Removes whitespace from both sides of a string.</li> </ul>	<pre>const user_input = "  Hello, there! ";  const trimmed_input = user_input.trim();  console.log(trimmed_input);</pre>	Hello, there!
<code>.charAt()</code>	<ul style="list-style-type: none"> <li>Gives the character at a specified index (position) in a string.</li> </ul>	<pre>const sentence = "Hello, world!"; const position = 7;  const character = sentence.charAt(position);  console.log("Character at position " + position + " is: " + character);</pre>	Character at position 7 is: w
<code>.split()</code>	<ul style="list-style-type: none"> <li>Divides a string into an array of substrings based on a specified delimiter</li> </ul>	<pre>const sentence = "This is a sample sentence.";  const words = sentence.split(" ");</pre>	Number of words: 5 Words: [ 'This', 'is', 'a',

		<pre>console.log("Number of words:", words.length); console.log("Words:", words);</pre>	<pre>'sample', 'sentence.' ]</pre>
<code>.includes()</code>	<ul style="list-style-type: none"> <li>Checks if a string contains a specified string.</li> </ul>	<pre>const sentence = "The weather forecast for tomorrow is sunny.";  const has_sun = sentence.includes("sun");  console.log("Contains 'sun':", has_sun);</pre>	<pre>Contains 'sun': true</pre>
<code>.indexOf()</code>	<ul style="list-style-type: none"> <li>Returns the position of the first occurrence of a value in a string.</li> </ul>	<pre>const sentence = "The book is on the table.";  const index_of_book = sentence.indexOf("book");  console.log("Index of 'book':", index_of_book);</pre>	<pre>Index of 'book': 4</pre>

## Additional Material

- **Learn more**
  - [W3Schools](#)