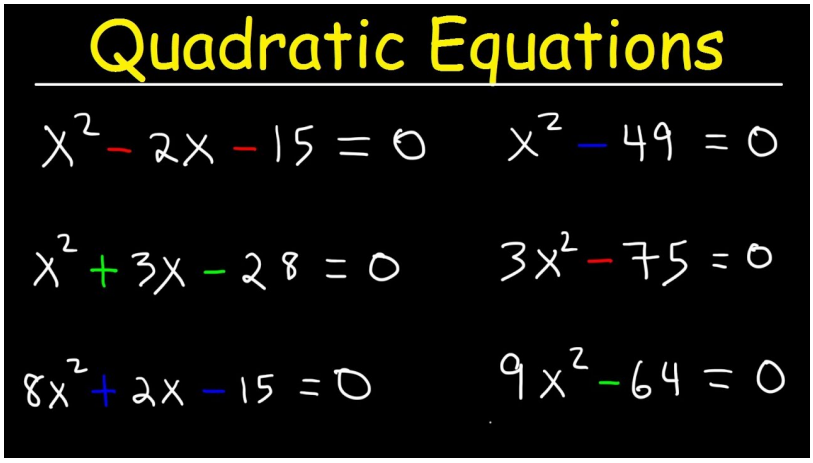
JavaScript Program to Solve Quadratic Equation



The standard form of a quadratic equation is:

```
ax2 + bx + c = 0, where
a, b and c are real numbers and
a ≠ 0
```

To find the roots of such equation, we use the formula,

```
(root1,root2) = (-b ± √b2-4ac)/2
```

The term `b 2 -4ac` is known as the **discriminant** of a quadratic equation. It tells the nature of the roots.

1. If the discriminant is greater than **0**, the roots are **real** and **different**.
2. If the discriminant is equal to **0**, the roots are **real** and **equal**.
3. If the discriminant is less than **0**, the roots are **complex** and **different**.

```
// program to solve quadratic equation
let root1, root2;

// take input from the user
let a = 19;
let b = 20;
```

```
let c = 15;

// calculate discriminant
let discriminant = b * b - 4 * a * c;

// condition for real and different roots
if (discriminant > 0) {
    root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
    root2 = (-b - Math.sqrt(discriminant)) / (2 * a);

    // result
    console.log(`The roots of quadratic equation are ${root1} and ${root2}`);
}

// condition for real and equal roots
else if (discriminant == 0) {
    root1 = root2 = -b / (2 * a);

    // result
    console.log(`The roots of quadratic equation are ${root1} and ${root2}`);
}

// if roots are not real
else {
    let realPart = (-b / (2 * a)).toFixed(2);
    let imagPart = (Math.sqrt(-discriminant) / (2 * a)).toFixed(2);

    // result
    console.log(
    `The roots of quadratic equation are ${realPart} + ${imagPart}i and ${realPart} - ${imagPart}i`
  );
}

//output:The roots of quadratic equation are -0.53 + 0.72i and -0.53 - 0.72i
```