

# Quadratic Equation Lesson

## Quadratic Equation Lesson

In this lesson, we will explore how to apply the quadratic equation and graphically demonstrate the correctness of the solution.

### Define variables

- We'll use **d** instead of **c** to avoid conflicts with the reserved function name in R.

[ a = 1, b = 2, d = 5 ]

### Quadratic Equation

The quadratic equation is given by:

$$f(x) = ax^2 + b + d = 0$$

Let's calculate the solutions to this equation.

```
# Define the quadratic equation coefficients
a <- 1
b <- 2
d <- 5

# Calculate the discriminant
discriminant <- b^2 - 4*a*d

# Check if the discriminant is non-negative (real solutions)
if (discriminant >= 0) {
  # Calculate the solutions
  x1 <- (-b + sqrt(discriminant)) / (2*a)
```

```

x2 <- (-b - sqrt(discriminant)) / (2*a)

# Print the solutions
cat("Solutions: x1 =", x1, ", x2 =", x2, "\n")
} else {
  cat("The quadratic equation has no real solutions.\n")
}

```

The quadratic equation has no real solutions.

## Graph

```

# Generate x values for plotting the quadratic function
x_values <- seq(-3, 3, length.out = 100)
y_values <- a * x_values^2 + b * x_values + d

# Plot the quadratic function
plot(x_values, y_values, type = "l", col = "blue", lwd = 2, main = "Quadratic Equation Gra
      xlab = "x", ylab = "f(x)")
grid()

```

