

```

7 # Solve the quadratic equation
8 solutions = sp.solve(quadratic_eq, x)
9 print(f"The solutions to the quadratic equation are: {solutions}")

```

## 1.5 Trigonometric Limits

### 1.5.1 Theorem: Sine Limit

**Theorem 1.7 : Sine Limit Theorem .**

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

**Corollary 1.8.** *From the limit of sine, we derive:*

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2} = \frac{1}{2}$$

**Exercise 1.4.** *Evaluate the following limit:*

$$\lim_{x \rightarrow 0} \frac{\tan x}{x}$$

### 1.5.2 C++ Code Snippet: Calculating Sine Limit

**Code Snippet 1.3 : Sine Limit Calculation in C++.**

```

1 #include <iostream>
2 #include <cmath>
3 using namespace std;
4
5 int main() {
6     double x = 0.0001; // Approaching zero
7     double sine_limit = sin(x) / x;
8
9     cout << "The value of sin(x)/x as x approaches 0 is approximately: " <<
10    ↪ sine_limit << endl;
11    return 0;
12 }

```