In [1]:
```
import matplotlib.pyplot as plt
```

In [2]:
```
def function(x):
    return(x+3)**2
def gradient(x):
    return 2*(x+3)
```

In [3]:
```
def gradient_descent(starting_x, learning_rate, num_iterations):
    x = starting_x
    x_values = [x]

    for i in range(num_iterations):
        grad=gradient(x)
        x = x-learning_rate*grad
        x_values.append(x)

        if abs(grad)<1e-6:
            break

    return x,x_values
starting_x = 2
learning_rate = 0.1
num_iterations = 100
```

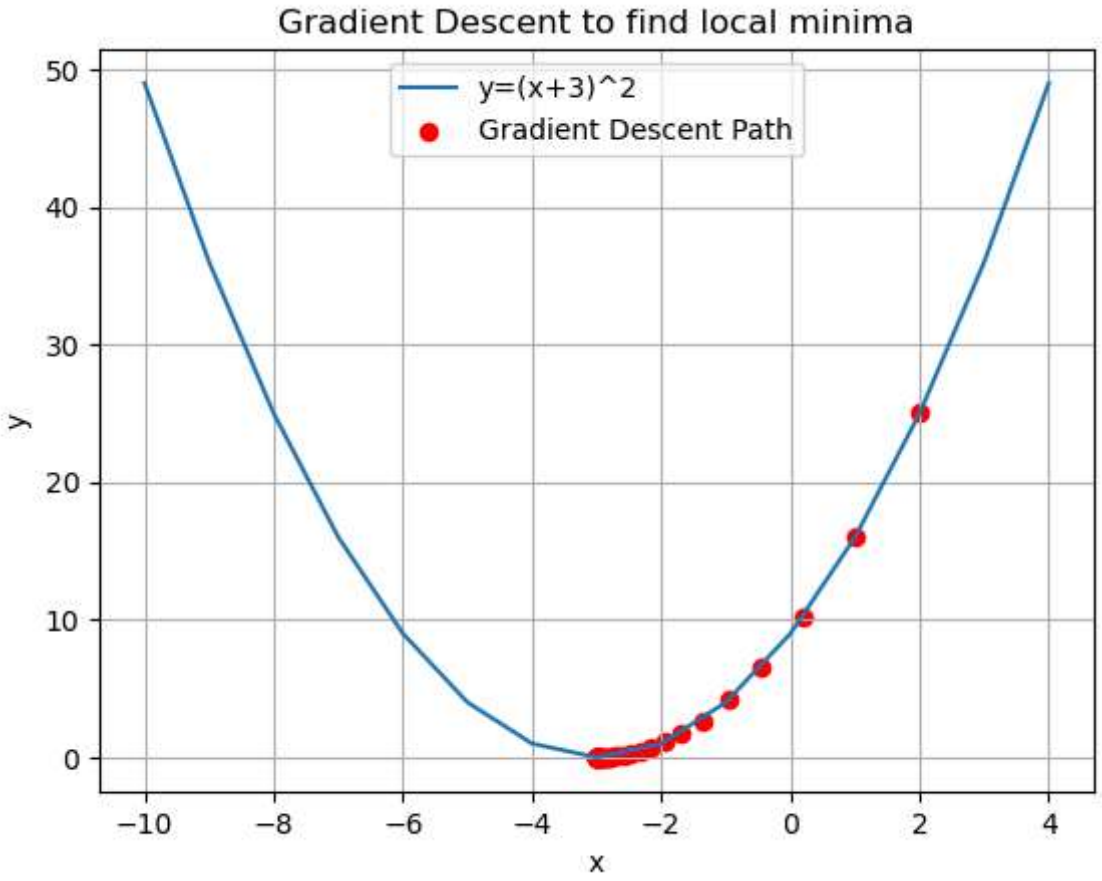
In [4]:
```
final_x,x_values = gradient_descent(starting_x, learning_rate, num_iteratio
```

In [5]:
```
print(f"The local minimum occurs at x = {final_x:6f}")
```

```
The local minimum occurs at x = -3.000000
```

In [6]:
```
x_range = range(-10,5)
y_values = [function(x) for x in x_range]
```

In [7]:
```
plt.plot(x_range, y_values, label='y=(x+3)^2')
plt.scatter(x_values,[function(x) for x in x_values], color='red', label =
plt.xlabel('x')
plt.ylabel('y')
plt.title('Gradient Descent to find local minima')
plt.legend()
plt.grid(True)
plt.show()
```



In [ ]:
```
```