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In [2]:  import numpy as np
         import scipy.stats as stats

         # Set a random seed for reproducibility
         np.random.seed(42)

         # Generate hypothetical IQ data
         sample_size = 25
         sample_data = np.random.normal(loc=102, scale=15, size=sample_size)  # mean=102, sa

         # Population mean under the null hypothesis
         population_mean = 100

         # Calculate T-statistic and p-value
         t_statistic, p_value = stats.ttest_1samp(sample_data, population_mean)

         # Print results
         print(f"Sample Mean: {np.mean(sample_data):.2f}")
         print(f"T-Statistic: {t_statistic:.4f}")
         print(f"P-Value: {p_value:.4f}")

         # Decision rule
         alpha = 0.05
         if p_value < alpha:
             print("Reject H₀: The average IQ score is significantly different from 100.")
         else:
             print("Fail to reject H₀: No significant difference from 100.")
```

```
Sample Mean: 99.55
T-Statistic: -0.1577
P-Value: 0.8760
Fail to reject H₀: No significant difference from 100.
```