COMMON TEST 1 JEEVANSH

```
# Import libraries for statistical tests
import numpy as np
import pandas as pd
from scipy.stats import ttest_1samp, ttest_ind, f_oneway
```

1 SAMPLE T TEST

```
# Data
sample_masses = [18.8, 6.8, 5.11, 2.0, 7.48, 10.96, 9.90, 7.67, 4.13,
11.8, 5.1, 10.0, 11.5, 1.87, 10.5, 7.0]
hypothesized_mean = 10  # Hypothesized population mean

# Perform one-sample t-test
t_stat, p_value = ttest_1samp(sample_masses, hypothesized_mean)

# Decision
alpha = 0.05
if p_value < alpha:
    conclusion = "Reject the null hypothesis. The mean mass is
significantly different from 10 g."
else:
    conclusion = "Fail to reject the null hypothesis. No significant
difference in mean mass."

print(f"t-statistic: {t_stat:.2f}")
print(f"P-value: {p_value:.4f}")
print(f"Conclusion: {conclusion}")
```

```
t-statistic: -1.72
P-value: 0.1061
Conclusion: Fail to reject the null hypothesis. No significant
difference in mean mass.
```

2 SAMPLE T TEST

```
# Data
upwind = [10.2, 9.9, 11.4, 10.1, 11.3, 10.3, 10.7, 9.7, 7.8, 9.8, 7.8,
10.1, 10.8, 10.0, 11.2, 11.3]
downwind = [27.8, 7.5, 9.5, 11.7, 8.1, 8.8, 8.8, 7.7, 7.0, 7.2, 9.0,
9.7, 11.3, 12.7, 12.9, 10.3, 9.5, 8.4]

# Perform independent t-test
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t_stat, p_value = ttest_ind(upwind, downwind, equal_var=True)

# Decision
alpha = 0.05
if p_value < alpha:
    conclusion = "Reject the null hypothesis. The mean mass of acorns
is significantly different between the two groups."
else:
    conclusion = "Fail to reject the null hypothesis. No significant
difference in mean mass between the two groups."

print(f"t-statistic: {t_stat:.2f}")
print(f"P-value: {p_value:.4f}")
print(f"Conclusion: {conclusion}")
```

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t-statistic: -0.24
P-value: 0.8113
Conclusion: Fail to reject the null hypothesis. No significant
difference in mean mass between the two groups.
```

ANOVA TEST

```
# Data
section_a = [56, 78, 90, 85, 73]
section_b = [62, 74, 88, 92, 81]
section_c = [58, 70, 80, 85, 79]

# Perform ANOVA test
f_stat, p_value = f_oneway(section_a, section_b, section_c)

# Decision
alpha = 0.05
if p_value < alpha:
    conclusion = "Reject the null hypothesis. The mean marks are
significantly different across the sections."
else:
    conclusion = "Fail to reject the null hypothesis. No significant
difference in mean marks across the sections."

print(f"F-statistic: {f_stat:.2f}")
print(f"P-value: {p_value:.4f}")
print(f"Conclusion: {conclusion}")
```

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F-statistic: 0.22
P-value: 0.8039
Conclusion: Fail to reject the null hypothesis. No significant
difference in mean marks across the sections.
```