Test Analysis

In [15]:
```
#Importing the neccessary libraries
import pandas as pd
import numpy as np
import scipy.stats as stats
import matplotlib.pyplot as plt

# Load the data
file_path = r"C:\Users\n\Downloads\student score.xlsx - Sheet1.csv"
data = pd.read_csv(file_path)

# Display the first few rows of the data
print(data.head())
```

```
   ID        Start time   Completion time      Email  Name  \
0   1  9/26/24 19:44:00  9/26/24 20:04:55  anonymous   NaN
1   2   9/27/24 8:55:30   9/27/24 9:15:32  anonymous   NaN
2   3  9/27/24 11:14:53  9/27/24 11:19:45  anonymous   NaN
3   4  9/29/24 10:03:56  9/29/24 10:15:21  anonymous   NaN

   Total points out of 19 Quiz feedback Grade posted time  Last modified time
\
0                      17     Well done   10/1/24 2:44:26                NaN
1                      16     well Done   10/1/24 3:14:18                NaN
2                      15     well done   10/1/24 3:14:06                NaN
3                      15     Well done   10/1/24 3:21:58                NaN

  A patient with Type 2 diabetes presents with chest pain and shortness of br
eath. Which of the following is the most critical cardiovascular complication
to monitor?  \
0                         a. Coronary artery disease
1                         a. Coronary artery disease
2                                       c. Stroke
3                         a. Coronary artery disease

   ...  \
0  ...
1  ...
2  ...
3  ...

   Feedback - A 50-year-old diabetic patient presents with chest pain. What s
hould the nurse prioritize to reduce the risk of cardiovascular events?  \
0                                                 NaN
1                                                 NaN
2                                                 NaN
3                                                 NaN

  Multiple-Response: Select all that apply. What should be included in the ca
re plan for a diabetic patient with coronary artery disease?  \
0  a. Strict glycemic control;c. Monitor choleste...
1  a. Strict glycemic control;c. Monitor choleste...
2  c. Monitor cholesterol levels;a. Strict glycem...
3  a. Strict glycemic control;c. Monitor choleste...

  Points - Multiple-Response: Select all that apply. What should be included
in the care plan for a diabetic patient with coronary artery disease?  \
0                                                   1
1                                                   1
2                                                   1
3                                                   0

   Feedback - Multiple-Response: Select all that apply. What should be includ
ed in the care plan for a diabetic patient with coronary artery disease?  \
0                                                 NaN
1                                                 NaN
2                                                 NaN
3                                      A-C-E 

  A patient with diabetes has an elevated HbA1c level. What does this indicat
e in relation to cardiovascular risk?  \
```

```
0  a. Increased risk for cardiovascular disease d...
1  a. Increased risk for cardiovascular disease d...
2  a. Increased risk for cardiovascular disease d...
3  a. Increased risk for cardiovascular disease d...

  Points - A patient with diabetes has an elevated HbA1c level. What does thi
s indicate in relation to cardiovascular risk?  \
0                                                  1
1                                                  1
2                                                  1
3                                                  1

   Feedback - A patient with diabetes has an elevated HbA1c level. What does
this indicate in relation to cardiovascular risk?  \
0                                                NaN
1                                                NaN
2                                                NaN
3                                                NaN

  What is the primary goal of statin therapy in patients with diabetes?  \
0                                                NaN
1                                                NaN
2                                                NaN
3                                                NaN

  Points - What is the primary goal of statin therapy in patients with diabet
es?  \
0                                                NaN
1                                                NaN
2                                                NaN
3                                                NaN

   Feedback - What is the primary goal of statin therapy in patients with dia
betes?
0                                                NaN
1                                                NaN
2                                                NaN
3                                                NaN

[4 rows x 69 columns]
```

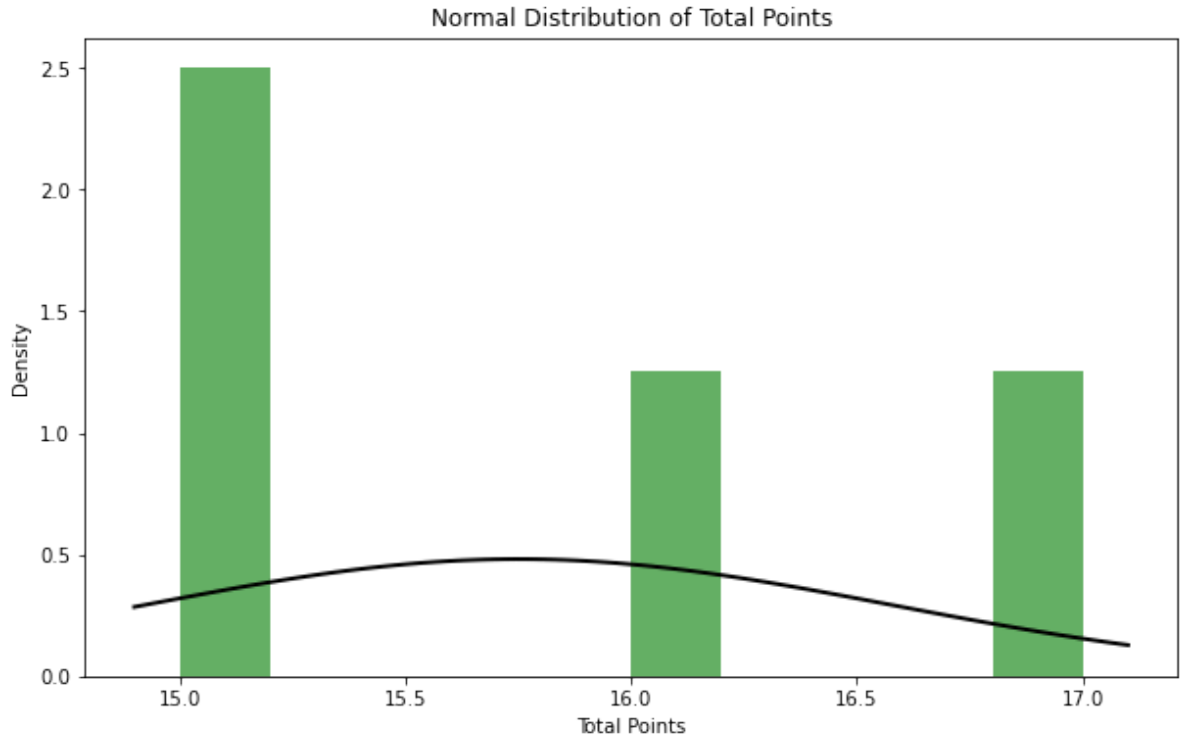
In [16]:
```
# Step 1: Frequency Distribution
frequency_distribution = data['Total points out of 19'].value_counts().sort_in
print("\nFrequency Distribution:\n", frequency_distribution)
```

```
Frequency Distribution:
 15    2
16    1
17    1
Name: Total points out of 19, dtype: int64
```

In [17]:
```
# Step 2: Normal Distribution Check
mean = np.mean(data['Total points out of 19'])
std_dev = np.std(data['Total points out of 19'])
print("\nMean:", mean)
print("Standard Deviation:", std_dev)
```

```
Mean: 15.75
Standard Deviation: 0.82915619758885
```

In [18]:
```
# Plotting the distribution
plt.figure(figsize=(10, 6))
plt.hist(data['Total points out of 19'], bins=10, density=True, alpha=0.6, col
xmin, xmax = plt.xlim()
x = np.linspace(xmin, xmax, 100)
p = stats.norm.pdf(x, mean, std_dev)
plt.plot(x, p, 'k', linewidth=2)
plt.title('Normal Distribution of Total Points')
plt.xlabel('Total Points')
plt.ylabel('Density')
plt.show()
```



In [19]:
```
# Step 3: Median
median = np.median(data['Total points out of 19'])
print("Median:", median)
```

```
Median: 15.5
```

In [20]:
```
# Step 4: P-value Calculation
# For demonstration, let's calculate the p-value for the total points against a
hypothetical_mean = 15
t_statistic, p_value = stats.ttest_1samp(data['Total points out of 19'], hypot
print("T-Statistic:", t_statistic)
print("P-Value:", p_value)
```

```
T-Statistic: 1.5666989036012806
P-Value: 0.21516994256954994
```

In [26]:
```
# Step 5: Discrimination Index Calculation for Each Question
for question in question_columns:
    # Fill NaN values with 0 (incorrect answer)
    correct_answers = data[question].fillna(0).astype(int)

    # Check if the question has constant answers (i.e., all answers are the sa
    if correct_answers.nunique() == 1:
        discrimination_index[question] = np.nan  # No discrimination if answer
        continue

    # Calculate the score
    score = data['Total points out of 19']

    try:
        # Calculate discrimination index using the correlation coefficient
        discrimination_index[question] = np.corrcoef(correct_answers, score)[0
    except Exception as e:
        # Handle any errors in correlation calculation
        discrimination_index[question] = np.nan
        print(f"Error calculating discrimination index for {question}: {e}")

# Print each question and its corresponding discrimination index
for question, index in discrimination_index.items():
    print(f"Question: {question}\nDiscrimination Index: {index}\n")
```

```
Question: Points - A patient with Type 2 diabetes presents with chest pain an
d shortness of breath. Which of the following is the most critical cardiovasc
ular complication to monitor?
Discrimination Index: 0.5222329678670935

Question: Points - Multiple-Response: Select all that apply. Which lifestyle
modifications should be recommended to reduce cardiovascular risks in a patie
nt with diabetes?
Discrimination Index: nan

Question: Points - When managing a patient with uncontrolled Type 2 diabetes,
which cardiovascular complication poses the highest risk?
Discrimination Index: -0.17407765595569782

Question: Points - A diabetic patient with coronary artery disease requires a
care plan. Which of the following should be included?
Discrimination Index: nan

Question: Points - What is the primary difference between Type 1 and Type 2 d
iabetes regarding cardiovascular risks?
Discrimination Index: nan

Question: Points - Which pharmacological treatment is typically used to manag
e cholesterol in diabetic patients to reduce cardiovascular risk?
Discrimination Index: nan

Question: Points - Fill-in-the-Blank: Tight _________ control is essential for
preventing cardiovascular complications in diabetic patients.
Discrimination Index: nan

Question: Points - A patient with Type 2 diabetes reports numbness in their e
xtremities. Which complication should be considered along with cardiovascular
risk?
Discrimination Index: nan

Question: Points - Multiple-Response: Select all that apply. Which interventi
ons should a nurse implement for a diabetic patient with high cardiovascular
risk?
Discrimination Index: nan

Question: Points - A diabetic patient is admitted with uncontrolled blood glu
cose levels and presents with elevated cholesterol. What is the primary cardi
ovascular complication the nurse should monitor for?
Discrimination Index: -0.17407765595569782

Question: Points - Which of the following lifestyle changes should a diabetic
patient implement to reduce cardiovascular risks?
Discrimination Index: nan

Question: Points - A patient with Type 2 diabetes and hypertension is prescri
bed an ACE inhibitor. What is the primary benefit of this medication for card
iovascular health?
Discrimination Index: nan

Question: Points - Fill-in-the-Blank: Monitoring _________ levels in diabetic
patients is essential to prevent cardiovascular complications such as heart a
ttacks.
```

```
Discrimination Index: 0.9045340337332909

Question: Points - A diabetic patient presents with blurred vision and elevat
ed blood pressure. Which complication should the nurse prioritize?
Discrimination Index: 0.17407765595569782

Question: Points - Which of the following is a major risk factor for cardiova
scular disease in Type 2 diabetic patients?
Discrimination Index: nan

Question: Points - A 50-year-old diabetic patient presents with chest pain. W
hat should the nurse prioritize to reduce the risk of cardiovascular events?
Discrimination Index: nan

Question: Points - Multiple-Response: Select all that apply. What should be i
ncluded in the care plan for a diabetic patient with coronary artery disease?
Discrimination Index: 0.5222329678670935

Question: Points - A patient with diabetes has an elevated HbA1c level. What
does this indicate in relation to cardiovascular risk?
Discrimination Index: nan

Question: Points - What is the primary goal of statin therapy in patients wit
h diabetes?
Discrimination Index: nan
```

THE END