First Category

A recent study shows that the average rating of student sleep and academic habits is 4.0 on a 5-point Likert scale. A researcher wants to determine whether the mean rating for a specific group of students significantly differs from 4.0. The researcher collected responses from 50 students on five key statements related to their sleep and academic experiences. The mean rating was 3.96, with a standard deviation of 0.2917. The hypothesis will be tested using a significance level of 0.05.

Ho=4.0
Ha≠4.0
a=0.05
1-a=0.05-100=95%
$\bar{x}$=3.96
μ=4.0
s=0.2917
n=50
CV=1.960

Two-tailed

Z-test

$$\frac{3.96 - 4.0}{\frac{0.2917}{\sqrt{50}}}$$

=

$$\frac{-0.04}{\frac{0.2917}{7.071}}$$

=

$$\frac{-0.04}{0.041}$$

=
Z-test= -0.976

Conclusion: The Ha is accepted, therefore, there is enough evidence to conclude that the average rating of students sleep and academic habits significally differs from the neutral score of 4.0.

Second Category

A recent study shows that the average rating toward using sleep quality and monitoring tools among students is 4.0 on a 5-point Likert scale. A researcher wants to determine if the mean rating for a specific group of students is less than 4.0. He gathered responses from 50 students on five key statements related to sleep monitoring and found that the mean rating was 3.66, with a standard deviation of 0.2903. Use the 0.05 level of significance.

Ho=4.0
Ha < 4.0
a=0.05
a=0.05-100=95%
$\bar{x}$=3.66
μ=4.0
s=0.2903
n=50
CV= - 1.960

One tailed
Left skewed

Z-test

$$\frac{3.66 - 4.0}{\frac{0.2903}{\sqrt{50}}}$$

=

$$\frac{-0.34}{\frac{0.2903}{7.071}}$$

=

$$\frac{-0.34}{0.041}$$

=
Z-test= -8.293

Conclusion: The Ha is rejected, therefore, there is not enough evidence to conclude that the students mean rating toward the use of sleep monitoring tools and awareness of sleep quality is less than 4.0.

Third Category

A recent study shows that the average rating for improvements after using sleep monitoring tools is 3.85 on a 5-point Likert scale. A researcher wants to determine if the mean rating for a specific group of students is significantly different from 3.85. He gathered responses from 25 students on ten key statements related to their improvements after using sleep monitoring, and found that the mean rating was 3.79, with a standard deviation of 0.1084.
Use the 0.05 level of significance.

Ho=3.85
Ha ≠ 3.85
a=0.05
a=0.05-100=95%
$\bar{x}$=3.79
μ=3.85
s=0.1084
n=25
CV= +- 2.064
Df= 25-1 = 24

Two-tailed

T-Test

$$\frac{3.79 - 3.85}{\frac{0.1084}{\sqrt{25}}}$$

=

$$\frac{-0.06}{\frac{0.1084}{5}}$$

=

$$\frac{-0.06}{0.022}$$

=
T-test= -2.727

Conclusion: The Ha is rejected, therefore, there is not enough evidence to conclude that the average rating for improvements after using sleep monitoring tools is significantly different from 3.85.