

Math Virtual Learning

AP stats / Interpretting p-values May 11th, 2020



Lesson: May 11th, 2020

Objective/Learning Target: Students will review p-values.

Review #1

The hawksbill sea turtle has an average clutch size of 140 eggs with a standard deviation of 8 eggs. We can assume a normal distribution. If we sample 5 nests, what is the probability of getting an average nest size of 135 or smaller?

Review #2

The loggerhead sea turtle has an average clutch size of 110 eggs with a standard deviation of 15 eggs and also follows a normal distribution. If we have a sample of 5 loggerhead clutches and a second sample of 5 hawksbill clutches. What is the probability of getting an average loggerhead clutch size at least as large as the average of the 5 hawksbill turtles?

Answers

1. S.E. =
$$\frac{8}{\sqrt{5}} \approx 3.58$$

 $z - score = \frac{135 - 140}{3.58} = -1.39 \rightarrow \text{p-value} = 0.08226$

We have about an 8% chance of getting a sample mean less than 135 eggs with a n=5

2. S.E. =
$$\sqrt{\frac{8^2}{5} + \frac{15^2}{5}} \approx 7.6$$

 $\mu_{diff} = 140 - 110 = 30$

Z-score =
$$\frac{0-30}{7.6}$$
 = $-3.95 \rightarrow$ p-value = 0.000039

There is a 0.0039% chance... not very likely.

p-values

For a long time p-values were the golden standard of statistical inference. One number that nicely summed up all the findings. In the last decade, they have come under fire. The journal <u>Basic and Applied Social Psychology</u> has banned the use of p-values, requiring different methods of inference. The American Statistical Association has released <u>quidelines</u> on the use of p-values. They are a hotly debated topic in the world of statistics. The biggest issue is the misinterpretation of these values. How we understand and communicate our findings are at least as important as the calculations we do to get them. Please review the following video about p-values.

understanding and interpreting p-values

Extra practice

Chapter 9.1 in textbook

Questions: 11-16 and 28