



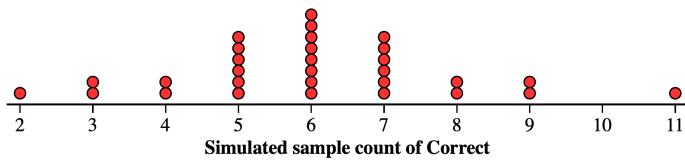
## Tracking the $P$ -value Through AP Statistics



From Wikipedia:

*The term "holy grail" is often used to denote an elusive object or goal that is sought after for its great significance.*

- Joy Milnes participated in an experiment in which she correctly identified 11 out of 12 shirts by whether or not they were worn by Parkinson's patients. To investigate if Joy can smell Parkinson's, an AP Statistics class simulated what the results might be if Joy had been simply guessing on all 12 shirts. Here are the class results:



Interpret the  $P$ -value

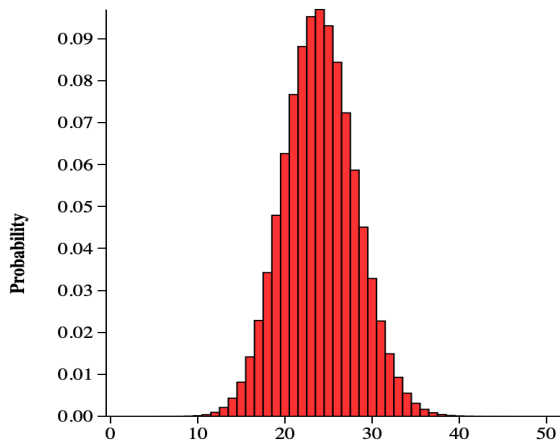
Claim:

Statistic:

Some evidence?

Convincing evidence?

- According to YouTube analytics, 30% of all AP Statistics students are using YouTube as part of their AP Exam review. College Board believes the true percent is higher and selects a random sample of 80 AP Statistics students to survey. In the sample, 32 students were using YouTube.



Interpret the  $P$ -value

Claim:

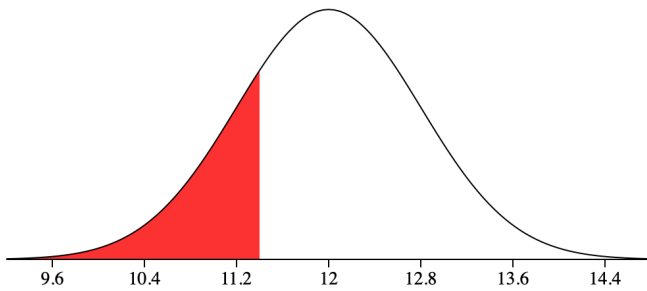
Statistic:

Some evidence?

Convincing evidence?

Name: \_\_\_\_\_ Hour: \_\_\_\_\_ Date: \_\_\_\_\_

3. Mr. Wilcox believes that 12 hours of preparing is needed to prepare for the AP Statistics Exam. A random sample of 20 AP Statistics students from last year revealed a mean of 11.4 hours spent preparing with a standard deviation of 3.72 hours. Do the data provide convincing evidence that last years' students spent less than 12 hours preparing, on average? Assume conditions are met.



Claim:

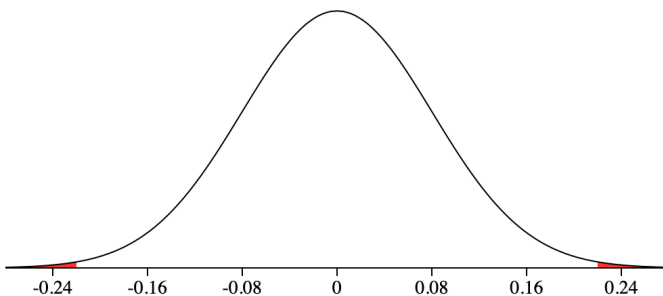
Statistic:

Some evidence?

Convincing evidence?

Interpret the  $P$ -value

4. A curious AP Statistics students wonders if the proportion of Reese's Pieces that are orange is different than the proportion of Skittles that are orange. Suppose she took an SRS of 50 Reese's Pieces and found the proportion that are orange ( $\hat{p}_1 = 0.42$ ) and an independent SRS of 100 Skittles and found the proportion that are orange ( $\hat{p}_2 = 0.20$ ).



Claim:

Statistic:

Some evidence?

Convincing evidence?

Interpret the  $P$ -value

5. The claim we are assuming to be true is the \_\_\_\_\_.
6. Because the  $P$ -value is a probability calculated by assuming some claim is true, it is a \_\_\_\_\_.

Name: \_\_\_\_\_ Hour: \_\_\_\_\_ Date: \_\_\_\_\_

## The Holy Grail of AP Statistics: The $P$ -value

Important ideas:

### Homework (AP Classroom)

Past studies indicate that about 60 percent of the trees in a forested region are classified as softwood. A botanist studying the region suspects that the proportion might be greater than 0.60. The botanist obtained a random sample of trees from the region and conducted a test of  $H_0 : p = 0.6$  versus  $H_a : p > 0.6$ . The  $p$ -value of the test was 0.015. Which of the following is a correct interpretation of the  $p$ -value?

- A If it is true that 60 percent of the trees in a forested region are classified as softwood, 0.015 is the probability of obtaining a population proportion greater than 0.6.
- B If it is true that 60 percent of the trees in a forested region are classified as softwood, 0.015 is the probability of obtaining a sample proportion as small as or smaller than the one obtained by the botanist.
- C If it is true that 60 percent of the trees in a forested region are classified as softwood, 0.015 is the probability of obtaining a sample proportion as large as or larger than the one obtained by the botanist.
- D If it is not true that 60 percent of the trees in a forested region are classified as softwood, 0.015 is the probability of obtaining a sample proportion as large as or larger than the one obtained by the botanist.
- E If it is not true that 60 percent of the trees in a forested region are classified as softwood, 0.015 is the probability of obtaining a population proportion greater than 0.6.