

Lesson 16: Describing Categorical Data; Proportions; Sampling  
Distribtion of a Sample Proportion

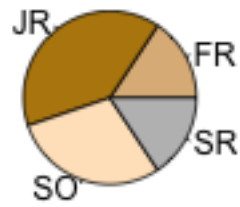
Homework

Solutions

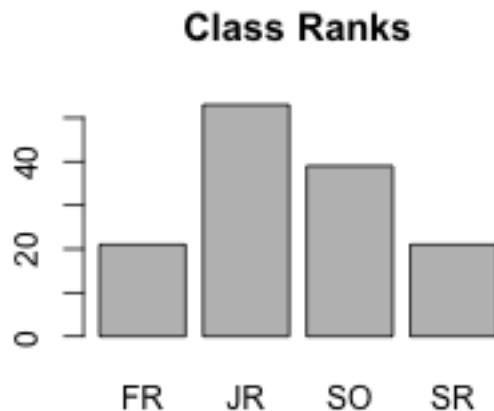
Please note that the steps show rounded numbers, but that the final answers to the problems are calculated without rounding.

Problem	Part	Solution
1	-	A pie chart is used for categorical data. Each slice represents a part of a whole. A histogram, on the other hand, is used for quantitative data. It is a visual representation of the spread of a set of data.

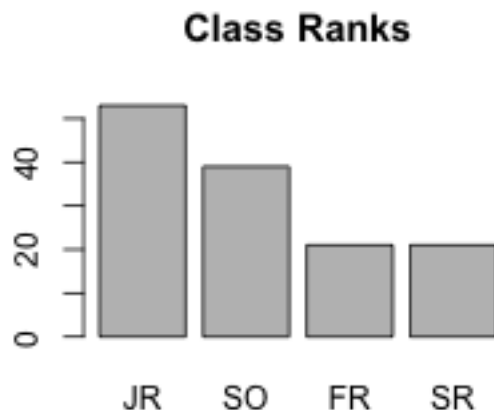
Class Ranks



2 -



3 -



4 -

5 -

The sample proportion  $\hat{p}$  will be approximately normal when  $n$  is large. How do we know if  $n$  is large? We will conclude that  $n$  is large when  $np \geq 10$  and  $n(1 - p) \geq 10$

6 -

7 -

The sample proportion  $\hat{p}$  will be approximately normal when:  
 $np \geq 10$  and  $n(1 - p) \geq 10$

$$1000(0.528) = 528 \geq 10 \text{ and } 1000(1 - 0.528) = 472 \geq 10$$

Since both conditions are true, we conclude that  $n$  is sufficiently large so that  $\hat{p}$  will be approximately normal.

8 -

The sampling distribution of  $\hat{p}$  is approximately normal with mean  $p = 0.528$  and standard deviation of 0.016.

9 -

$$z = -1.774$$

10 -

$$P(Z = -1.774) = 0.038$$

11 -

The sample proportion  $\hat{p}$  will be approximately normal when:  
 $np \geq 10$  and  $n(1 - p) \geq 10$

$$4040(0.5) = 2020 \geq 10 \text{ and } 4040(1 - 0.5) = 2020 \geq 10$$

Since both conditions are true, we conclude that  $n$  is sufficiently large so that  $\hat{p}$  will be approximately normal.

Problem	Part	Solution
12	-	The sampling distribution of $\hat{p}$ is approximately normal with mean $p = 0.5$ and standard deviation of 0.008.
13	-	$P(Z = 0.881 \text{ or } Z = -0.881) = 0.378$