# Hypothesis test for single proportion via CLT

### Soda taste test example

Some people claim they can tell the difference between a diet soda and a regular soda in the first sip. A researcher wanted to test this claim using a hypothesis test at the 0.05 significance level.

- He randomly sampled 80 people who claimed they can tell the difference.
- He then filled 80 plain white cups with soda, half diet and half regular through random assignment, and asked each person to take one sip from their cup and identify the soda as diet or regular.
- 53 participants correctly identified the soda.

Let p be the proportion of people who correctly identify soda type among people who think they can tell the difference.

# Step 1 $H_0$ :

 $H_A:$ 

#### Step 2

Calculate useful summary information and set  $\alpha$ 

#### Step 3

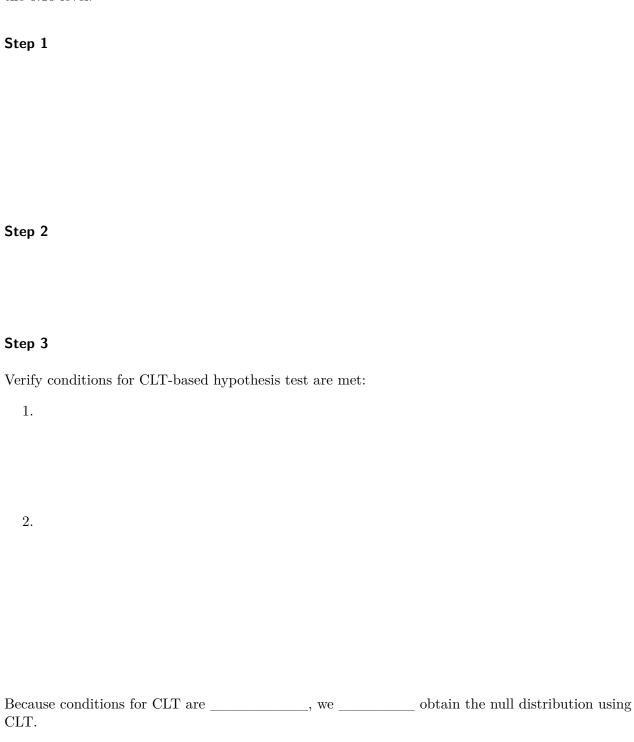
Find null distribution of  $\hat{p}$  via CLT.

• Check conditions:

Because conditions for CLT areCLT.	, we	obtain the null distribution using
• Obtain null distribution of $\hat{p}$ :		
To find p-value:		
• Calculate our observed test statist	ic:	
-	$= \frac{\text{point est.} - \text{null value}}{\text{SE}_0}$	ue
	$\mathfrak{SE}_0$	
• Calculate p-value		
- Draw a picture of a Normal d	listribution, and shade	in the correct area
<ul> <li>Write R code that correspond</li> </ul>	s to the probability of	interest
Step 4		
Decision:		
Conclusion:		

## M&Ms example

M&M's reported that 14% of its candies are yellow. We are interested in testing this claim. In a random sample of 100 M&M's, 9 were found to be yellow. Conduct a hypothesis test via CLT at the 0.10 level.



• Null distribution:
To find p-value:
• Calculate our observed test statistic
• Calculate p-value
<ul> <li>Calculate p-value</li> <li>Draw a picture of a Normal distribution, and shade in the correct area</li> </ul>
- Draw a picture of a Normal distribution, and shade in the correct area
- Write probability statement and $R$ code that corresponds to the probability of interest
Step 4
Decision:
Conclusion: