1. A mayor is concerned about the percentage of city residents who express disapproval of his job performance. His political committee pays for a newspaper ad, hoping that it will keep the disapproval rate below 13%. They will use a follow-up poll to assess the ad's effectiveness. What are the correct null and alternative hypotheses?
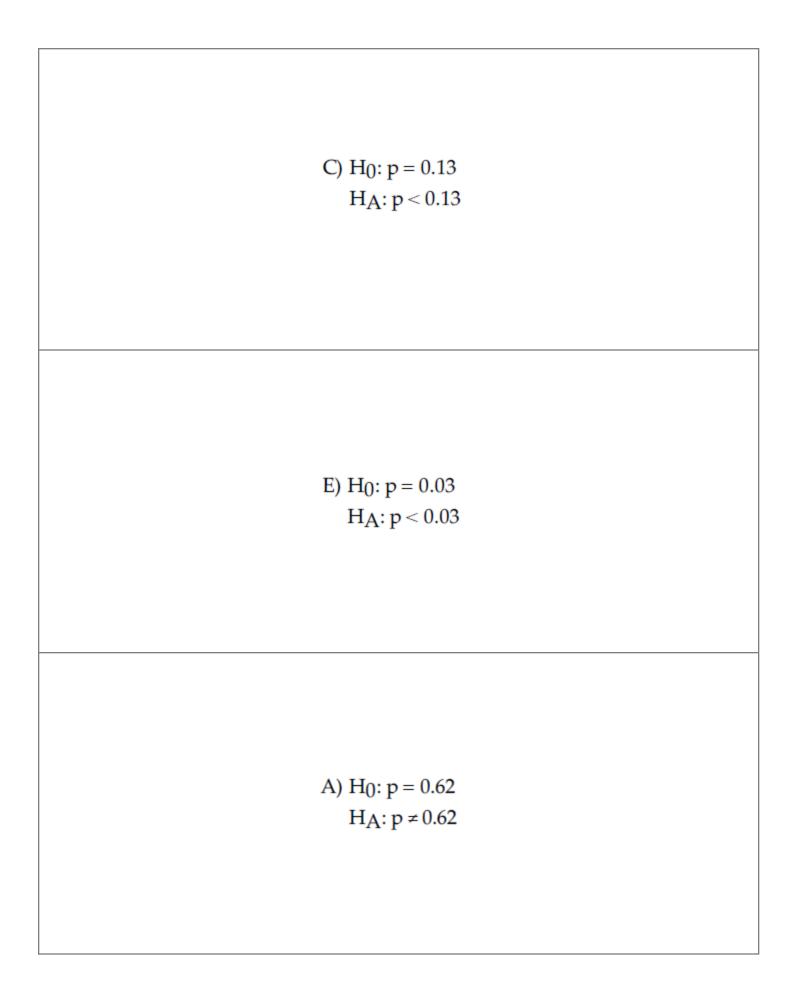
A) $H_0: p > 0.13$
   $H_A: p = 0.13$

B) $H_0: p > 0.13$
   $H_A: p < 0.13$

C) $H_0: p = 0.13$
   $H_A: p < 0.13$

D) $H_0: p = 0.13$
   $H_A: p > 0.13$

E) $H_0: p < 0.13$
   $H_A: p = 0.13$

2. 3% of trucks of a certain model have needed new engines after being driven between 0 and 100 miles. The manufacturer hopes that the redesign of one of the engine's components has solved this problem. What are the correct null and alternative hypotheses?

A) $H_0: p < 0.03$
   $H_A: p = 0.03$

B) $H_0: p = 0.03$
   $H_A: p > 0.03$

C) $H_0: p < 0.03$
   $H_A: p > 0.03$

D) $H_0: p > 0.03$
   $H_A: p = 0.03$

E) $H_0: p = 0.03$
   $H_A: p < 0.03$

3. At a local university, only 62% of the original freshman class graduated in four years. Has this percentage changed? What are the correct null and alternative hypotheses?

A) $H_0: p = 0.62$
   $H_A: p \neq 0.62$

B) $H_0: p < 0.62$
   $H_A: p > 0.62$

C) $H_0: p < 0.62$
   $H_A: p = 0.62$

D) $H_0: p \neq 0.62$
   $H_A: p = 0.62$

E) $H_0: p = 0.62$
   $H_A: p < 0.62$

C) $H_0: p = 0.13$
   $H_A: p < 0.13$

E) $H_0: p = 0.03$
   $H_A: p < 0.03$

A) $H_0: p = 0.62$
   $H_A: p \neq 0.62$

4. The federal guideline for smog is 12% pollutants per 10,000 volume of air. A metropolitan city is trying to bring its smog level into federal guidelines. The city comes up with a new policy where city employees are to use of city transportation to and from work. A local environmental group does not think the city is doing enough and no real change will occur. An independent agency, hired by the city, runs a test on the air. What are the null and alternative hypotheses?

A) $H_0: p = 0.12$ C) $H_0: p \neq 0.12$
   $H_A: p \neq 0.12$ $H_A: p = 0.12$

B) $H_0: p < 0.12$ D) $H_0: p = 0.12$ E) $H_0: p = 0.12$
   $H_A: p > 0.12$ $H_A: p > 0.12$ $H_A: p < 0.12$

---

5. A new manager, hired at a large warehouse, was told to reduce the 26% employee sick leave. The manager introduced a new incentive program for employees with perfect attendance. The manager decides to test the new program to see if it's better. What are the null and alternative hypotheses?

A) $H_0: p = 0.26$
   $H_A: p \neq 0.26$
                      D) $H_0: p > 0.26$
B) $H_0: p = 0.26$ $H_A: p < 0.26$
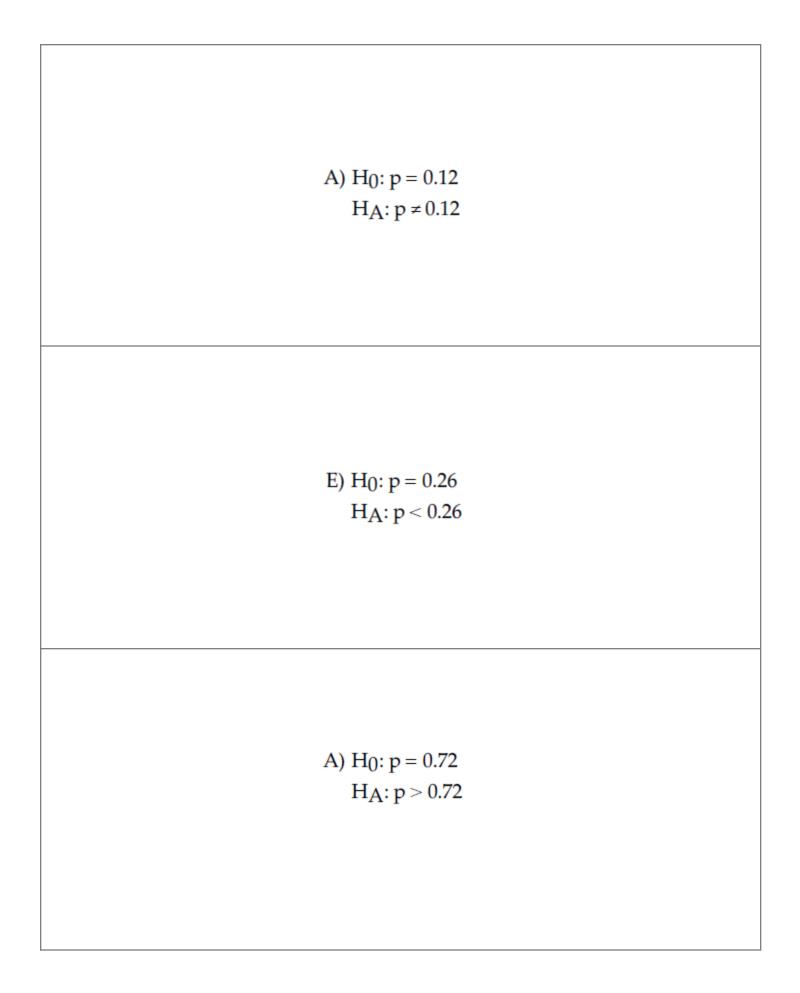 $H_A: p > 0.26$

C) $H_0: p < 0.26$ E) $H_0: p = 0.26$
   $H_A: p = 0.26$ $H_A: p < 0.26$

---

6. A weight loss center provided a loss for 72% of its participants. The center's leader decides to test a new weight loss strategy to see if it's better. What are the null and alternative hypotheses?

A) $H_0: p = 0.72$
   $H_A: p > 0.72$

B) $H_0: p > 0.72$ D) $H_0: p = 0.72$
   $H_A: p < 0.72$ $H_A: p \neq 0.72$

C) $H_0: p > 0.72$ E) $H_0: p = 0.72$
   $H_A: p = 0.72$ $H_A: p < 0.72$

A) H_0: p = 0.12
H_A: p ≠ 0.12

E) H_0: p = 0.26
H_A: p < 0.26

A) H_0: p = 0.72
H_A: p > 0.72

7. A survey investigates whether the proportion of 8% for employees who commute by car to work is higher than it was five years ago. What are the null and alternative hypotheses?

A) $H_0: p > 0.08$
   $H_A: p < 0.08$

B) $H_0: p = 0.08$ D) $H_0: p = 0.08$
   $H_A: p \neq 0.08$ $H_A: p < 0.08$

C) $H_0: p < 0.08$ E) $H_0: p = 0.08$
   $H_A: p = 0.08$ $H_A: p > 0.08$

8. The U.S. Department of Labor and Statistics released the current unemployment rate of 5.3% for the month in the U.S. and claims the unemployment has not changed in the last two months. However, the state's statistics reveal that there is a change in U.S. unemployment rate. What are the null and alternative hypotheses?

A) $H_0: p \neq 0.053$ C) $H_0: p > 0.053$
   $H_A: p = 0.053$ $H_A: p < 0.053$

B) $H_0: p = 0.053$ D) $H_0: p < 0.053$ E) $H_0: p = 0.053$
   $H_A: p \neq 0.053$ $H_A: p = 0.053$ $H_A: p > 0.053$

9. The county health department has concerns about the chlorine level of 0.4% mg/mL at a local water park increasing to unsafe level. The water department tests the hypothesis that the local water park's chlorine proportions have remained the same. What are the null and alternative hypotheses?

A) $H_0: p = 0.004$ C) $H_0: p > 0.004$
   $H_A: p < 0.004$ $H_A: p < 0.004$

B) $H_0: p = 0.004$ D) $H_0: p = 0.004$ E) $H_0: p > 0.004$
   $H_A: p > 0.004$ $H_A: p \neq 0.004$ $H_A: p = 0.004$

D) H_0: p = 0.08

H_A: p < 0.08

B) H_0: p = 0.053

H_A: p ≠ 0.053

B) H_0: p = 0.004

H_A: p > 0.004