Name: Student 1 ID:

Election Predictions

___/30

The website FiveThirtyEight.com uses statistical models and polling data to predict the outcomes of national and state-level elections. In 2018, 538 predicted the results of 506 elections (435 House, 35 Senate, and 36 Governors). The Lite forecast, which considers only local and national polls, correctly predicted the outcome of 482 of the 506 elections (95.26%). Each race is identified as a toss-up, lean, likely, or solid district, reflecting the degree of certainty of the prediction.

Nate Silver would like to determine whether his predictions using the Lite model are significantly better than the expected success rate, 0.69. Of the 38 classified as 'Lean' races, FiveThirtyEight.com correctly predicted the outcome of 32 races.

1. What is the research question? [1pt]
Is the Lite model significantly better than the expected success rate.

2. What is the observational unit? [1pt]
A single unit race the Lite model ~~correctly~~ ~~predicted~~

3. What is the parameter? [1pt]
The long run proportion of the Light model predicting an outcome correctly in a sample of 38 lean races.

4. Calculate the sample statistic [1pt]
$\hat{p} = 0.84$

5. What is H_0? [1pt] $\pi = 0.69$

6. What is H_A? [1pt] $\pi > 0.69$

7. What type of hypothesis test is this? Circle all that are correct: [.5pt each]

(one-sided) two-sided random

Name: Student 1 ID:

8. You want to conduct a simulation to answer the research question. To test the hypotheses above, you set the one-proportion applet to have the following values: [1pt each]

   a. Probability of heads: 0.69

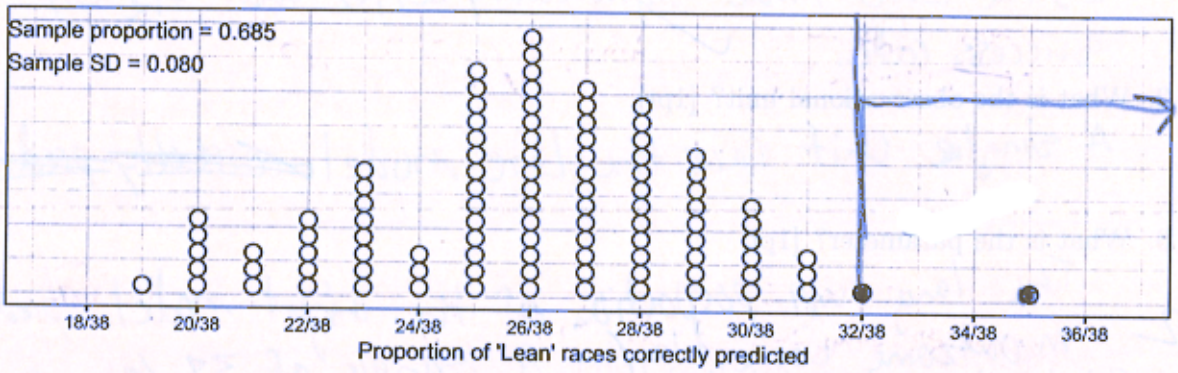
   b. Number of tosses: 38

   c. Number of repetitions: 100

9. In this simulation, what does a heads represent? [1pt]

   A successful prediction from the light model in a sample of 38

10. Your simulation produces the data shown in the plot below:



   a. What does a dot represent in the plot? [2pt]

   1 sample case of correct lite model predictions in a sample of 38 attempts

   b. On the plot, draw one or two vertical line(s) to indicate the cutoff(s), and an arrow(s) indicating the direction(s) of H_A. Shade in the dots corresponding to the simulation p-value calculation. [3pt]

   c. Calculate the simulation p-value: [2pt]

   p-value = $\frac{2}{100} = .02$

   d. What is your conclusion? [3pt]

   With a p-value of .02 it is lower than 0.05 therefore Ho can be rejected and the Lite model predicts significantly better at a rate greater than 0.69,

Name: Student 2 ID:

Election Predictions

_____/30

The website FiveThirtyEight.com uses statistical models and polling data to predict the outcomes of national and state-level elections. In 2018, 538 predicted the results of 506 elections (435 House, 35 Senate, and 36 Governors). The Lite forecast, which considers only local and national polls, correctly predicted the outcome of 482 of the 506 elections (95.26%). Each race is identified as a toss-up, lean, likely, or solid district, reflecting the degree of certainty of the prediction.

Nate Silver would like to determine whether his predictions using the Lite model are significantly better than the expected success rate, 0.69. Of the 38 classified as 'Lean' races, FiveThirtyEight.com correctly predicted the outcome of 32 races.

1. What is the research question? [1pt]
   If Nate's predictions are better than the expected success rate

2. What is the observational unit? [1pt]
   1 lean race

3. What is the parameter? [1pt]
   $\sqrt{\frac{\pi(1-\pi)}{n}}$ $\sqrt{\frac{.69(1-.69)}{38}} = \sqrt{\frac{0.2139}{38}} \approx 0.075$

4. Calculate the sample statistic [1pt]
   0.08

5. What is H_0? [1pt]
   $H_0 = \pi = 0.69$

6. What is H_A? [1pt]
   $H_a = \pi > 0.69$

7. What type of hypothesis test is this? Circle all that are correct: [.5pt each]

   (one-sided) two-sided random

Name: Student 2 ID:

8. You want to conduct a simulation to answer the research question. To test the hypotheses above, you set the one-proportion applet to have the following values: [1pt each]

   a. Probability of heads: .69

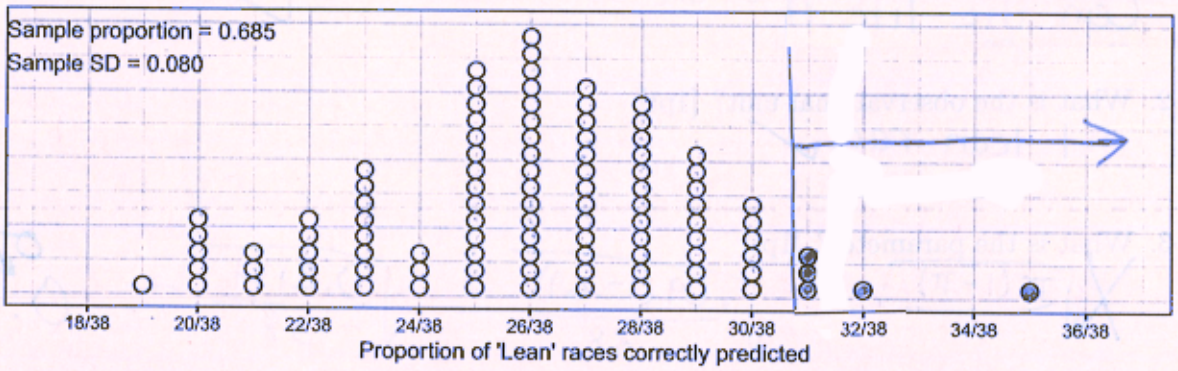
   b. Number of tosses: 38

   c. Number of repetitions: 100

9. In this simulation, what does a heads represent? [1pt]

   The null success Rate

10. Your simulation produces the data shown in the plot below:



   a. What does a dot represent in the plot? [2pt]

   # Lean races predicted in the 100 repitation simulation

   b. On the plot, draw one or two vertical line(s) to indicate the cutoff(s), and an arrow(s) indicating the direction(s) of H_A. Shade in the dots corresponding to the simulation p-value calculation. [3pt]

   c. Calculate the simulation p-value: [2pt]

   P = 0.685

   d. What is your conclusion? [3pt]

   That I failed to reject the null hypothesis because Nates light model predictions are not more correct than the expected Success rate

Name: Student 3 ID:

Election Predictions

___ ___/30

The website FiveThirtyEight.com uses statistical models and polling data to predict the outcomes of national and state-level elections. In 2018, 538 predicted the results of 506 elections (435 House, 35 Senate, and 36 Governors). The Lite forecast, which considers only local and national polls, correctly predicted the outcome of 482 of the 506 elections (95.26%). Each race is identified as a toss-up, lean, likely, or solid district, reflecting the degree of certainty of the prediction.

Nate Silver would like to determine whether his predictions using the Lite model are significantly better than the expected success rate, 0.69. Of the 38 classified as 'Lean' races, FiveThirtyEight.com correctly predicted the outcome of 32 races.

1. What is the research question? [1pt]

Can the lite model predict the outcomes more efficiently than other models

2. What is the observational unit? [1pt]

lean race predicted correct

3. What is the parameter? [1pt]

4. Calculate the sample statistic [1pt]

5. What is H_0? [1pt]

$H_0 = 0.69$

6. What is H_A? [1pt]

$H_A > 0.69$

7. What type of hypothesis test is this? Circle all that are correct: [.5pt each]

one-sided two-sided random

Name: Student 3 ID:

8. You want to conduct a simulation to answer the research question. To test the hypotheses above, you set the one-proportion applet to have the following values: [1pt each]

   a. Probability of heads: 0.5

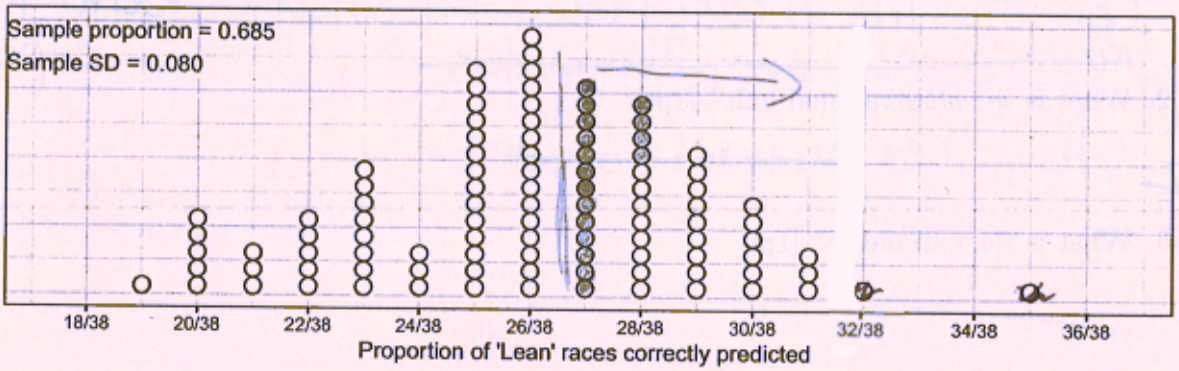
   b. Number of tosses: 5

   c. Number of repetitions: 100

9. In this simulation, what does a heads represent? [1pt]

   One side of a proportion

10. Your simulation produces the data shown in the plot below:



   a. What does a dot represent in the plot? [2pt]

   Number of lean races predicted

   b. On the plot, draw one or two vertical line(s) to indicate the cutoff(s), and an arrow(s) indicating the direction(s) of H_A. Shade in the dots corresponding to the simulation p-value calculation. [3pt]

   c. Calculate the simulation p-value: [2pt]

   Wish I knew how

   d. What is your conclusion? [3pt]

   The light model exceeded the null hypothesis, therefore, making more accurate.

Name: Student 4 ID:

Election Predictions

____/30

The website FiveThirtyEight.com uses statistical models and polling data to predict the outcomes of national and state-level elections. In 2018, 538 predicted the results of 506 elections (435 House, 35 Senate, and 36 Governors). The Lite forecast, which considers only local and national polls, correctly predicted the outcome of 482 of the 506 elections (95.26%). Each race is identified as a toss-up, lean, likely, or solid district, reflecting the degree of certainty of the prediction.

Nate Silver would like to determine whether his predictions using the Lite model are significantly better than the expected success rate, 0.69. Of the 38 classified as 'Lean' races, FiveThirtyEight.com correctly predicted the outcome of 32 races.

1. What is the research question? [1pt] is using the Lite model significantly better than the expected $\pi = .69$?

2. What is the observational unit? [1pt] ~~data to predict~~ outcomes of national & state elections

3. What is the parameter? [1pt] correct predictions

4. Calculate the sample statistic [1pt] $\hat{p} = \frac{32}{38} = .84$

5. What is H_0? [1pt] $H_0 : \pi = .69$

6. What is H_A? [1pt] $H_A : \pi > .69$

7. What type of hypothesis test is this? Circle all that are correct: [.5pt each]

one-sided two-sided random

Name: Student 4 ID:

8. You want to conduct a simulation to answer the research question. To test the hypotheses above, you set the one-proportion applet to have the following values: [1pt each]

   a. Probability of heads: .69

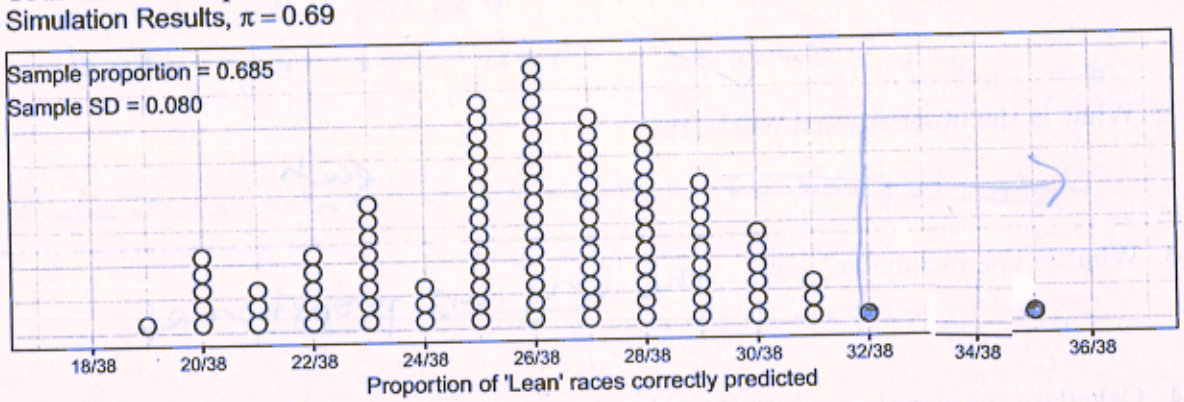
   b. Number of tosses: 539

   c. Number of repetitions: 100

9. In this simulation, what does a heads represent? [1pt]

   ~~a set of~~ each time the prediction was correct

10. Your simulation produces the data shown in the plot below:



   a. What does a dot represent in the plot? [2pt]

   a single set out of 100 simulations

   b. On the plot, draw one or two vertical line(s) to indicate the cutoff(s), and an arrow(s) indicating the direction(s) of H_A. Shade in the dots corresponding to the simulation p-value calculation. [3pt]

   c. Calculate the simulation p-value: [2pt]

   $\frac{2}{100} = .02$ p value = .02

   d. What is your conclusion? [3pt]

   with a p-value .02 we have moderate evidence to reject the null hypothesis.

Student 5

Election Predictions

The website FiveThirtyEight.com uses statistical models and polling data to predict the outcomes of national and state-level elections. In 2018, 538 predicted the results of 506 elections (435 House, 35 Senate, and 36 Governors). The Lite forecast, which considers only local and national polls, correctly predicted the outcome of 482 of the 506 elections (95.26%). Each race is identified as a toss-up, lean, likely, or solid district, reflecting the degree of certainty of the prediction.

Nate Silver would like to determine whether his predictions using the Lite model are significantly better than the expected success rate, 0.69. Of the 38 classified as 'Lean' races, FiveThirtyEight.com correctly predicted the outcome of 32 races.

1. What is the research question? [1pt]
Did nate predict significantly higher than the expected success rate? 0.84

2. What is the observational unit? [1pt]
the 38 'Lean' races

3. What is the parameter? [1pt]
the parameter is 0.69 or the expected success rate

4. Calculate the sample statistic [1pt]
the sample statistic is 32/38, 0.8421, or 84.21%.

5. What is H_0? [1pt]
Nate's predictions were significantly higher than the expected success rate.

6. What is H_A? [1pt]
Nate's predictions were not significantly higher than the expected success rate.

7. What type of hypothesis test is this? Circle all that are correct: [.5pt each]

(one-sided) two-sided (random)

Name: Student 5 ID:

8. You want to conduct a simulation to answer the research question. To test the hypotheses above, you set the one-proportion applet to have the following values: [1pt each]

   a. Probability of heads: 0.84

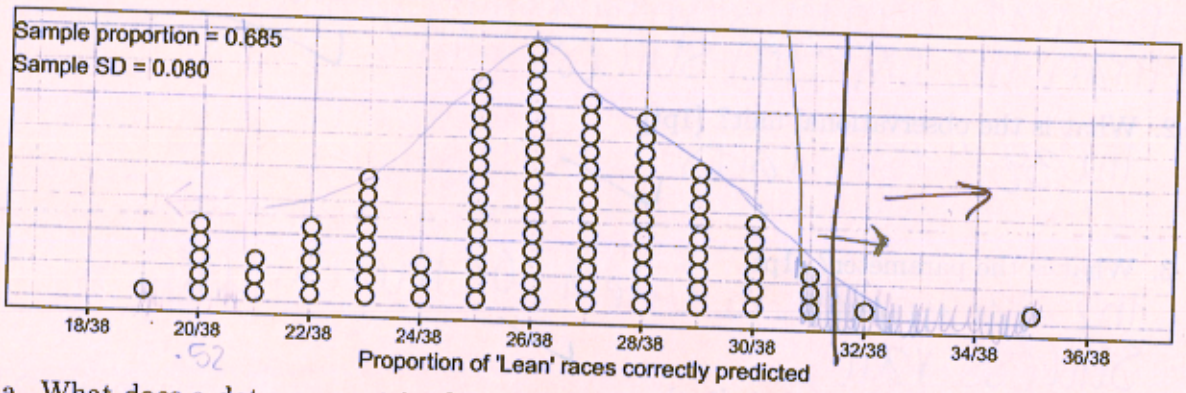
   b. Number of tosses: 38

   c. Number of repetitions: 100

9. In this simulation, what does a heads represent? [1pt]

   predictions that are significantly better than the expected success rate.

10. Your simulation produces the data shown in the plot below:



   a. What does a dot represent in the plot? [2pt]

   A correct prediction.

   b. On the plot, draw one or two vertical line(s) to indicate the cutoff(s), and an arrow(s) indicating the direction(s) of H_A. Shade in the dots corresponding to the simulation p-value calculation. [3pt]

   c. Calculate the simulation p-value: [2pt]

   0.42

   d. What is your conclusion? [3pt]

   fail to reject the null hypothesis.