
Mock FRQ #6

93% of students in Mr. Adkins AP statistics class turn in their assignments on time, 85% of Mr. Adkins AP statistics students turn in their assignments with every problem completed, and 80% of Mr. Adkins AP statistics students turn in their assignments on time and with every question completed. Assume that assignment submissions are independent.

- (a) Given that a randomly selected assignment is turned in late, what is the probability that every problem was completed?
- (b) If Mr. Adkins randomly selects student assignments one at a time, what is the probability that the first assignment he finds that is not turned in on time with every question completed is one of the first 5 selected?
- (c) Mr. Adkins has 70 total AP statistics students. Describe the distribution of the proportion of papers that are turned in complete and on time for a randomly chosen assignment.
- (d) Explain how you would conduct a simulation to estimate the probability that at least 68 of Mr. Adkins 70 AP statistics students would turn an assignment in on time.

Because of the coronavirus crisis, Mr. Adkins AP statistics classes are now involved in remote learning, and Mr. Adkins is worried that the proportion of assignments that are completed and on time has decreased. To see if this is true, Mr. Adkins randomly selects 50 student assignments from before the remote learning began and randomly selects 50 student assignments from after remote learning started. He finds that 37 of the assignments from the traditional school group were completed and on time, while only 30 of the assignments from the remote learning group were completed and on time. Use this information to answer the following questions.

- (e) Identify the explanatory and response variables in Mr. Adkins' study.

Explanatory:

Response:

- (f) Was Mr. Adkins' study an observational study or an experiment? Explain.
- (g) Describe a method by which Mr. Adkins could use a matched pairs design to improve his study.
- (h) Mr. Adkins wants to use the results of his study to construct a 95% confidence interval for the difference in the proportion of assignments completed and on time for the traditional school group and the remote learning group. Confirm that all appropriate conditions have been satisfied.
- (i) The confidence interval from part (h) is calculated to be $(-0.0423, 0.3223)$. Interpret the results of this confidence interval in the context. Based on the results of this confidence interval do you believe there is convincing evidence that the proportion of students turning in assignments complete and on time has decreased since remote learning began.