

Instructions: For Questions 1-4, please use the data in the Excel file to address the claims made in each problem. The data for each problem is stored in a separate tab! You may type up your responses if that is easiest, or you can write them out by hand.

For each of problems 1-4, you must: 1) state the hypotheses being tested 2) give the results of the test 3) provide the correct decision and conclusion.

1. In comparing the job placement success of engineering students at Clarkson to those at RPI, you collect sample data from a set of recent graduates from Clarkson and from the same number at RPI. You believe that the starting salary for Clarkson grads is higher on average.
2. To report a mileage estimate to the EPA for a new sedan, a car manufacturer randomly selects a sample of cars from its production line. They test each car under identical conditions and record the mileage per gallon (mpg) for each car. The manufacturer would like to claim the mileage is over 30 mpg for this sedan.
3. Drug companies do a lot of clinical trials while researching their products. Early in drug development, these companies conduct trials of their drug on normal, healthy individuals. In a crossover design, each sampled person receives both the drug and a placebo. In one such study, measurements are kept of the average weight while on a placebo and while on the drug. The company wishes to claim that their drug aids in weight loss.

4. The Idaho Potato Growers Association wants to find out if their potatoes are any better than other states' potatoes. They randomly sample a number of individuals and ask each to eat a baked potato from a particular state and rank their satisfaction on a scale from 1-10 (with 10 being the best). The association would like to claim that their potatoes are the best.
5. An assembly plant requires particular components to be used during the assembly process. It receives regular shipments of 1,000 such components. A quality control inspector randomly selects 15 components from these shipments. If none of them are defective, the inspector accepts the shipment.
- (a) If 1% of the components being shipped are defective, what is the probability that the shipment is accepted?
- (b) If 10% of the components being shipped are defective, what is the probability that the shipment is accepted?

6. A test for a disease can be given to individuals who wish to know if they have the disease or not. A testing center is considering two tests that could be used for the same disease. Suppose the disease is present in 25% of individuals in the population. Test 1 is a rapid test. If you have the disease, there is a 79% chance that the Test 1 will come back positive. If you do not have the disease, there is a 91% chance Test 1 will come back negative. Test 2 is a widely used slower test. If you have the disease, there is a 76% chance that the Test 2 will come back positive. If you do not have the disease, there is a 98% chance Test 2 will come back negative. Determine the following (for each test!) and use them to decide which test you would ultimately recommend:

(a) The probability that you have the disease if the result is positive.

(b) The probability that you don't have the disease if the result is negative.

(c) The probability that the test returns the correct results.

(d) Which test is recommended? (Justify your answer.)