

## Discrete Hypothesis Testing With Approximation

1. It is known that historically one person in a hundred who enters buys a car at a local car dealership (independent of one another). A new manager claims that since he took over, that proportion has risen. Out of the next two hundred people who entered, five purchased a vehicle. Test at the 5% level the manager's claim.
2. A customer at a casino has a suspicion that a die being used is not giving the correct number of sixes. To test this hypothesis she watches the next 60 rolls and notes that three sixes are rolled. Test her claim at the 2% significance level.
3. A long serving secretary makes on average 20 errors per year and her errors are known to be distributed with a Poisson distribution. Her manager has a suspicion that she has recently become less careful in her work. Over the next year she makes 27 errors. Test her manager's claim at the 5% level.
4. A tulip bulb manufacturer claims that the proportion of tulip bulbs that don't flower is one in twenty. A customer knows that the company is under new management and has reason to believe that this proportion has changed. The customer plants 60 tulip bulbs and none fail to flower. Test at the 10% level the customer's claim.
5. Historically a footballer is known to have scored 70% of his penalties (independent of one another). Since going to David Beckham's football academy he believes that this proportion has risen. Out of the next 100 penalties he scores 81 of his penalties. Test at the 1% level the footballer's claim.
6. Historically on archaeological digs, golden amulets are found in the ground at a rate of 0.4 per square metre and known to follow a Poisson distribution. The lead professor thinks that this rate will be changed on the latest dig in Patagonia. On this dig 30 golden amulets are found in an area of 100 square metres. Test the professor's claim at the 10% level.