

Section 1: Introducing hypothesis testing

Exercise level 1

1. Jessica complains that a dice she is using is biased so that she is less likely to get a 6. She decides to test at the 5% significance level the hypothesis that the dice is biased against a six.
 - (i) Write down the null and alternative hypothesis that Jessica will use.
Jessica throws the dice 20 times and gets just one six.
 - (ii) Find the p -value for this test.
 - (iii) What is Jessica's conclusion?
2. Hassan complains that a dice he is using is biased so that he is more likely to get a 1 than any other number. He decides to test at the 10% significance level the hypothesis that the dice is biased towards a 1.
 - (i) Write down the null and alternative hypothesis that Hassan will use.
Hassan throws the dice 12 times and gets 5 ones.
 - (ii) Find the p -value for this test.
 - (iii) What is Hassan's conclusion?
3. A bus company claims that a particular service is on time in 90% of journeys. I think it is less than this. I decide to test this at the 5% significance level.
 - (i) Write down the null and alternative hypothesis that I should use.
In my next 15 journeys, the bus is on time 10 times.
 - (ii) Find the p -value for this test.
 - (iii) What is my conclusion?
4. Over a long period of time, it is found that a particular bus service is on time in 80% of journeys. The bus company claims that it has made improvements to the service and that the bus is now on time more often. I decide to test this at the 10% significance level.
 - (i) Write down the null and alternative hypotheses that I should use.
In my next 16 journeys, the bus is on time 15 times.
 - (ii) Find the p -value for this hypothesis test.
 - (iii) What is my conclusion?