

Section 2: More about 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 throw the dice 30 times and test at the 5% significance level the hypothesis that the dice is biased against a six.
 - (i) Write down the null and alternative hypotheses that Jessica will use.
 - (ii) Let X be the number of sixes that Jessica gets from 30 throws. Find $P(X \leq 1)$ and $P(X \leq 2)$.
 - (iii) Write down the critical region for this test and explain what this means.

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 throw the dice 50 times and test at the 10% significance level the hypothesis that the dice is biased towards a 1.
 - (i) Write down the null and alternative hypotheses that Hassan will use.
 - (ii) Let X be the number of ones that Hassan gets from 50 throws. Find $P(X \geq 12)$ and $P(X \geq 13)$.
 - (iii) Write down the critical region for this test and explain what this means.

3. Brad wants to test whether a coin is biased
 - (i) Write down the null and alternative hypotheses that Brad will use.
Brad decides to carry out his test at the 5% level. He tosses the coin 50 times and gets 18 heads.
 - (ii) What is the p -value?
 - (iii) What is the conclusion of Brad's test?
 - (iv) Find the critical region for Brad's test.