

Part 7.4: Mean and Standard Deviation

You may have noticed at the start I gave you three formulas... we are now going to use the last two of these... they are for calculating the mean and the standard deviation.

$$\mu = n\pi \quad \sigma = \sqrt{n\pi(1 - \pi)}$$

With these (which are given to us) we can very quickly and easily calculate the mean and standard deviation for a binomial distribution. Let's look at an example.

Example

I flip a coin 100 times, what is the mean and standard deviation for the number of heads I get?

Answer

The first thing we need to do is identify n and π . As n is the number of trials and we flip the coin 100 times, $n = 100$ and π is the probability of a head occurring which we know is 0.5. We then just substitute these into the formulas, making $\mu = n\pi = 100 \times 0.5 = 50$ and $\sigma = \sqrt{n\pi(1 - \pi)} = \sqrt{100 \times 0.5(1 - 0.5)} = 5$

Exercise 7.4

For each of the following situations calculate the mean and the standard deviation.

1. The probability of a person being allergic to peanuts is 0.1 and I have a group of 10 students.
2. In a manufacturing process 12% of items are faulty. I need to take a sample of 30 people.
3. The probability of having to stop at a traffic light is 0.4. I drive through 5 sets of traffic lights on the way to work.
4. I have a box of 6 calculators. The probability of the calculator working is 0.9.
5. In a multi-choice test there are 5 possible answers to each question and there are 10 questions.
6. Each morning I make myself lunch. 60% of the time I make myself cheese sandwiches, the rest of the time I make something else. The time period we are looking at is one week (5 days).