

1. A factory produces a variety of bracelet making sets for children. Each set contains a random sample of 200 beads coloured red, orange, yellow, green, blue, indigo and violet. The most popular set that they make is called 'Princess's Parlour' and claims to use the coloured bead in a ratio of 4 : 4 : 3 : 2 : 1 : 5 : 5 respectively. If their claim is true, how many of each coloured bead would you expect to see in a 'Princess Parlour' kit?
2. Over the last 5 years, farmer Martin has been recording the number of calves born to each of his cows. As a cow's gestation period is similar to that of a woman, they can have up to 6 calves in a five year period. He found that the probability of a cow giving birth in any given year is 0.5. Making the assumptions that the cows pregnancies are independent of one another and that a cow can only birth one calf each pregnancy, calculate the expected number of calves to be born to each of the 142 cows at the farm in the next five years.
3. A local community hall has 4 separate entrances; one leading out to the memorial garden, one that leads to the car park, one that goes straight out onto Jenton Lane and the fourth which goes out to Fairmile Walk. Kerry, the community centre manager wants to block off the door to Fairmile Walk as she doesn't think it is used very much and is causing an unnecessary safety breach in the centre. Donald, a volunteer at the centre disagrees with Kerry and thinks the doors are all used equally. They plan to record the number of people who enter each door of the community centre over the next month to see who is correct. If 130 members of the community come to the centre in the next 30 days, how many would you expect to see coming through each door if Donald is correct?
4. A new machine is being trialled at a hospital which is able to identify up to six independent genetic disorders in unborn babies with no harm to mother or baby. It is known that the probability of the unborn baby having any of these disorders is 0.23 if the mother is in a 'high risk' category. If the machine is used on 100 'high risk' women at the hospital in the first week, calculate the expected number of pregnancies to be identified as having either 0, 1, 2, 3, 4, 5 or 6 of the genetic disorders.
5. The number of spelling errors on a first draft of a novel are known to be at a constant average rate of 4 per page. In a sample of the first 10 pages of the novel there were no more than 8 spelling mistakes found on each page. Calculate the expected number of spelling errors on each of the 348 pages of the first draft of the novel. Assume that the number of spelling errors are independent of each other.
6. Employees at Mt. Blanc Inc have a bad reputation for absenteeism at work. Directors are looking to take action to change the working week to try and combat how much money they are spending on paid sick leave. Over the past 5 years it has been calculated that the proportion of absences on Monday – Friday is 3 : 2 : 1 : 1 : 6 respectively with an average of 42 absences per week. Calculate the average number of expected absences for each day of the week.