

Mixed Probability Problems

1. Let A denote the event 'student is female' and let B denote the event 'student is French'. In a class of 100 students suppose 60 are French, and suppose that 10 of the French students are females. Find the probability that if I pick a French student, it will be a girl.
2. If the probability that person A will be alive in 20 years is 0.7 and the probability that person B will be alive in 20 years is 0.5, what is the probability that they will both be alive in 20 years?
3. What is the probability that the total of two dice will be greater than 8, given that the first die is a 6?
4. A fair die is tossed twice. Find the probability of getting a 4 or 5 on the first toss and a 1, 2, or 3 in the second toss.
5. It is known that the probability of obtaining zero defectives in a sample of 40 items is 0.34 whilst the probability of obtaining 1 defective item in the sample is 0.46. What is the probability of
 - (a) obtaining not more than 1 defective item in a sample?
 - (b) obtaining more than 1 defective items in a sample?
6. The probability that a student passes Mathematics is $\frac{2}{3}$ and the probability that he passes English is $\frac{4}{9}$. If the probability that he will pass at least one subject is $\frac{4}{5}$, what is the probability that he will pass both subjects? (We assume it is based on probability only.)

7. If the independent probabilities that three people A, B and C will be alive in 30 years time are 0.4, 0.3, 0.2 respectively, calculate the probability that in 30 years' time,

- (a) all will be alive
- (b) none will be alive
- (c) only one will be alive
- (d) at least one will be alive

8. A bag contains 5 white marbles, 3 black marbles and 2 green marbles. In each draw, a marble is drawn from the bag and not replaced. In three draws, find the probability of obtaining white, black and green in that order.

9. Of all the smokers in a particular district, 40% prefer brand A and 60% prefer brand B. Of those smokers who prefer brand A, 30% are females, and of those who prefer brand B, 40% are female. What is the probability that a randomly selected smoker prefers brand A, given that the person selected is a female?