Binomial Distribution

1. A dice is rolled three times. What is the probability of obtaining the following?

    i. Exactly one 6.

    ii. Exactly two 6's.

    iii. Exactly three 6's.

    iv. At least one 6.

2. Darragh is late for school 30% of days. In one week of five consecutive schooldays, find the probability that Darragh is late for school:

    i. No times.

    ii. Only one time.

    iii. More than one time.

3. Jake plays FIFA on the X-box. In an online game of FIFA against an opponent, the probability that Jake wins is 65%. He plays six games against this opponent, where no draws are allowed. What is the probability that Jake will win:

    i. The first, second and fifth game?

    ii. Exactly three games?

4. 25% of all Leaving Cert students sit higher level maths. If you select a group of 5 Leaving Cert students at random, what is the probability that:

    i. All five study higher level maths?

    ii. The majority of the group study higher level maths?

5. Jane is a busy woman, who usually can only answer her phone 20% of the time. One afternoon, her phone is called five times. What is the probability that:

    i. She answers the first call but misses all of the rest?

    ii. She misses all the calls?

    iii. She answers exactly one of the calls?

    iv. She answers at least two of the calls?

6. A multiple choice test has 10 questions. Each question has four choices. Rebecca didn't study for the test so she guesses every answer. What is the probability she gets:

    i. All questions wrong?

    ii. Exactly four questions correct?

    iii. At least two questions correct?

7. According to an extensive survey, it was revealed that 15% of teenagers smoke. If you take a sample of six teenagers, what is the probability that:

    i. None of them smoke?

    ii. At least one of them smokes?

8. A fair coin is flipped n times. Show that the probability of getting exactly two heads is $\dfrac{n^2 - n}{2^{n+1}}$.

9. Michael is a very good hurler. Over the course of the season it was found that his scoring accuracy from the 65 yard line is 85%. Michael is practicing his 65 yard shots at training. He must score 10 times before he can finish. Find the probability that this takes him 15 shots.

10. A fair coin is flipped repeatedly until exactly three heads appear. Find the probability that this will take exactly five flips.

11. Aebfhinn is practicing her hockey penalties, which she usually scores with 90% accuracy. At the end of training she decides she will take penalty flicks until she scores 5 penalties. Find the probability that she scores her fifth penalty;

    i. On her fifth shot?

    ii. On her 8th shot?

12. An unbiased dice is rolled repeatedly until 6 appears for the third time. Find the probability that this takes 7 rolls of the dice.

13. 30% of students in sixth year in your school have a part time job. During lunch hour you ask random people in sixth year in your school if they have a part time job. This process is repeated until three people with part time jobs are found. Find the probability that this will take exactly 10 people.

14. Matthew, a basketball player, shoots free throws with 70% accuracy. How many free throws must he shoot to ensure that there is a greater than 95% chance that he scored at least once?

15. What is the minimum number of times an unbiased dice must be rolled in order to ensure that the probability of getting at least one 6 is greater than 99%?