Name:_____ **Date:**_____

Math 10 Honours section 7.5 Binomial Distribution

1. An archer can hit a target 75% of the time. What is the probability that the archer would hit the target 8 out of 10 times?

2. Steve Nash made 88% of all his free throws in his career. What is the probability that he would make 9 out of the 10 next free throws?

3. A multiple choice test has 10 questions. There are 5 possible answers to each question. To pass the test, a student will need to get 6 out of 10 questions correct. If a student guesses all the answers, what is the probability that the student will pass?

4. A recent survey of British Columbia high school grade 12 students revealed that 65% of students did not take Math 12. Determine the probability that in a group of 100 randomly selected grade 12 students:
    a. Exactly 31 took Math 12.

    b. At least 31 took Math 12

    c. Between 31 and 45 inclusive took Math 12.

5. The Canucks are playing a best of seven series against the Sharks. The probability of the Canucks defeating the Sharks on any given game is 0.55.
    a. Determine the probability that the Canucks will win the series in exactly 5 games

    b. Determine the probability of the Canucks winning the series in at most six games.

6. A certain game involves rolling a pair of dice. If doubles, a sum of eleven or a sum of seven is rolled, a person would win the game. A person plays the game six times.
    a) Given that the person won at least four times, what is the probability that the person won exactly five times?

    b) Use the binomial probability functions in your calculators for this question. Include the function and the values used to determine your answer

7. A couple is planning on having a child and the probability of getting a boy is 0.490. A family with 6 children has at least two girls. What is the probability that his family has exactly 4 girls?

8. Jason is playing cards and is given a hand with seven cards. What is the probability that there are exactly 4 hearts in that hand?

9. Jerry is writing a true false test. To pass this test, he needs to get half of the questions correct. Suppose he is guessing the answer to each question. Is Jerry more likely to pass the test with more questions or with fewer questions? Justify your answer.

10. Ten thousand students are waiting to be selected for an internship and 15 students are from Moscrop Secondary. If there are 10 internship positions available, what is the probability that amongst the 10 students chosen that 3 or more will be from Moscrop? Can the binomial distribution be used for this question? Why or why not? Explain:

11. A fair coin is flipped 6 times. What is the probability that there are more heads than tails?

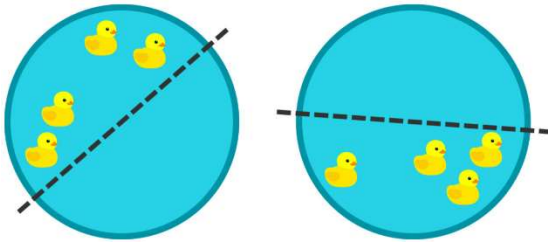
12. A fair coin is flipped 100 times. What is the probability that there are more heads than tails?

13. A coin is altered so that the probability that it lands on heads is less than 0.5 and when the coin is flipped four times, the probability of an equal number of heads tail is 1/6. What is the probability that the coin lands on heads? Amc 12 2010

14. Each face of a cube is painted either red or blue, each with probability 0.5. The color of each face is determined independently. What is the probability that the painted cube can be placed on a horizontal surface so that the four vertical faces are all the same color? Amc 12 2004

15. A box contains exactly five chips, three red and two white. Chips are randomly removed one at a time without replacement until all the red chips are drawn or all the white chips are drawn. What is the probability that the last chip drawn is white? Amc 2001

16. 4 small ducks are in a large circular pond, and can each be at any point in the circle with equal chance. What is the probability that a diameter can be drawn so that all 4 ducks are in the same semicircle of the pond?



17. A king decides to play a game with 3 prisoners and would spare their lives if they win. Each of the prisoners is to stand on a spot numbered from 1 to 1000. The king would roll a dice multiple times and then take the sum of each roll until he reaches a sum greater or equal to 1000. For instance, if the king rolls a 3, then the first sum is 3. If the king then rolls a 5, then the sum would be 8 and so on. The prisoners are freed if they stand on a number that is equal to the sum at any point of the game. What numbers should the prisoners stand on to maximize their chance of surviving?