BINOMIAL DISTRIBUTION PROBLEMS

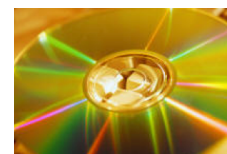1. The probability that Kyla will score above a 90 on a mathematics test is 4/5. What is the probability that she will score above a 90 on exactly three of the four tests this quarter?

2. What is the probability of obtaining exactly eight heads in ten tosses of a fair coin?

3. Experience has shown that 1/200 of all CDs produced by a certain machine are defective. If a quality control technician randomly tests twenty CDs, compute each of the following:
   • P(exactly one is defective)

   • P(half are defective)

   • P(no more than two are defective)

4. A fair coin is tossed 5 times. What is the probability that it lands tails up exactly 3 times?

5. After studying a couple's family history, a doctor determines that the probability of any child born to this couple having a gene for disease X is 1 out of 4. If the couple has three children, what is the probability that exactly two of the children have the gene for disease X?
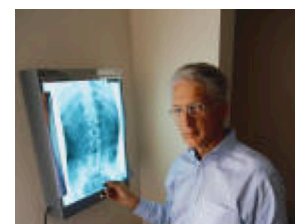
6. If a binomial experiment has seven trials in which the probability of success is p and the probability of failure is q, write an expression that could be used to compute each of the following probabilities:
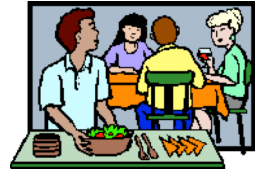   • P(exactly five successes)

   • P(at least five successes)

   • P(at most five successes)

7. On any given day, the probability that the entire Watson family eats
   dinner together is 2/5. Find the probability that, during any 7-day
   period, the Watson's eat dinner together at least six times.

8. When Joe bowls, he can get a strike (knock down all of the pins) 60% of the time.
   How many times more likely is it for Joe to bowl at least three strikes out of four
   times as it is for him to bowl zero strikes out of four tries? Round answer to the
   nearest whole number.

9. A board game has a spinner on a circle that has five equal sectors,
   numbered 1, 2, 3, 4, and 5, respectively. If a player has four spins, find the
   probability that the player spins an even number no more than two times
   on those four spins.
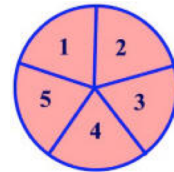
10. In the old days, there was a probability of 0.8 of success in any attempt
    to make a telephone call. (This often depended on the importance of the
    person making the call, or the operator's curiosity!)
    Calculate the probability of having 7 successes in 10 attempts.