Chapter 11   **Introduction to Genetics**   **Name** _____

Worksheet   Mathematical Probability Problems

Directions: Show your work for problems that are too complex to do in your head. Place your answers on the right side and make them obvious. The outcome of a genetics cross is not a certainty but rather a probability, that is a mathematical chance of an event occurring. The probability is calculated by determining two aspects. One is 'what are you asking for' and two 'how many possible outcomes are there to be considered'.

Rules for determining probability:

     a.) What has occurred in the past is not factored in to the prediction of future outcomes.

     b.) When predicting multiple events, multiply the probability for each event.

     c.) If the terms either - or are in the statement, do not multiply these events. Instead, add the probabilities.

1. What is the probability of drawing any three from a deck of cards? (A normal deck has   _____
    52 playing cards).

2. What is the probability of drawing a heart from a deck of cards?   _____

3. What is the chance of drawing a three of hearts from a deck of cards?   _____

4. What are the odds of drawing either a heart or diamond from a deck of cards?   _____

5. What is the chance of the next child being born a male if you already have a family of
    three sons and one daughter?   _____

6. What is the probability of having the first and second babies born of the female gender?   _____

7. What is the probability of having a family with only three sons? _____

8. What is the probability of having the next born child a daughter if you already have four sons? _____

9. At GFH, one girl in two is blonde, and one girl in three is slim. All the students are witty. What is the chance that the next girl you see will blonde, slim and witty? _____

10. Albinism is a recessive trait. A husband and wife are heterozygous for albinism. They wish to have a family of four children. What are the chances of having one normal for skin color and three being born with albinism? (use the binomial expansion method of $(a + b)^4$). _____

11. What is the probability of rolling an even number on a die, flipping a heads on a coin, drawing an ace of hearts from a regular deck of cards, and having a daughter born as your first child? _____

12. Find the probability of rolling either a three or a four with a die and drawing either a heart or a diamond from a deck of cards. _____