Counting problems involving "OR"   NAME:

For this entire worksheet, you are asked for the number of successes only; you do *not* need to find complete probabilities. The formulas will reflect this by using "*n*" instead of "*P*".

We will work with the example of pulling one card from a poker deck.

A poker deck contains four suits: diamonds, hearts, spades, and clubs. The diamonds and hearts are red and the spades and clubs are black. Each suit has thirteen cards: Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, and King. This makes a total of 52 cards. A face card will be defined to be a Jack, Queen, or King. An even number means 2, 4, 6, 8, or 10.

1.) Let's investigate the outcomes where our card is a Spade <u>or</u> an even number. Follow the steps outlined below. **You are asked for the number of successes only; you do *not* need to find complete probabilities.**

a.) List out the cards that are Spades. How many are there? (Yes, I want you to write all 13 down.)

b.) List out the cards that are even numbers. How many are there? (From the whole deck, not just the Spades.)

c.) Which cards fall into both of these categories? How many are there?

d.) How many outcomes are a Spade <u>or</u> an even number? (This means I want to add the Spades, the even numbered cards, and those which happen to be both.) Make sure your answer follows the rule $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ where A represents the Spades and B represents the even numbered cards.

2.) Let's investigate the outcomes where our card is a face card or an even number. Follow the steps outlined below. **You are asked for the number of successes only; you do *not* need to find complete probabilities.**

a.) List out the face cards. How many are there?

b.) List out the cards that are even numbers. How many are there?

c.) Which cards fall into both of these categories? How many are there?

d.) How many outcomes are a face card or an even number? (This means I want to add the face cards, the even numbered cards, and those which happen to be both.) Notice we could use the rule $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ where A represents the face cards and B represents the even numbered cards. However, the intersection ($A \cap B$) is empty so we can just find $n(A \cup B) = n(A) + n(B)$.

Consider picking one card out of a poker deck. For each question, tell how many outcomes (successes) exist for each situation. **You are asked for the number of successes only; you do *not* need to find complete probabilities.**

3.) How many outcomes are red or a King? Describe the successes; you do *not* need to list them all out.

4.) How many outcomes are red or a King of Spades? Describe the successes; you do *not* need to list them all out.

5.) How many outcomes are a face card or a King? Describe the successes; you do *not* need to list them all out.

6a.) Consider rolling two distinguishable, fair, six-sided dice. Quickly form a two-way table showing the 36 outcomes. Label one die green and the other red.

For each question, tell how many outcomes (successes) exist for each situation. Use your table. Denote those successes on the sample space you made above. **You are asked for the number of successes only; you do *not* need to find complete probabilities.**

6b.) How many outcomes have a sum of 7?

6c.) For how many outcomes is the red die 2?

6d.) How many outcomes have a sum of 7 and at the same time the red die is 2?

6e.) For how many outcomes is the sum 7 or the red die is 2?

6f.) Which rule (from question 1*d* or 2*d*) would be used to answer question 6*e*? Why?