Probability, Combinations and Permutations

Names: __________________________________________________________

Definitions

Probability –

Permutation –

Combination –

Factorial –

Card Experiment – Probability

1. Find the probability of drawing a card that is red with an even number from a full deck of cards.

2. Find the probability of drawing a card that black without a number from a full deck of cards.

Card Experiment – Permutations and Combinations

1. List the permutations and combinations of selecting two cards from a set of five cards. Find the number of permutations and combinations.

<table>
<thead>
<tr>
<th>Permutations List</th>
<th>Combinations List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Permutations = __________</td>
<td>Number of Combinations = __________</td>
</tr>
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2. List the permutations and combinations of selecting three cards from a set of five cards. Find the number of permutations and combinations.

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Number of Permutations = __________  
Number of Combinations = __________

Formulas:

<table>
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Calculations with formulas:

3. Using the formulas we just stated, determine the number of permutations and combinations for when we select 5 cards from a set of 20 cards. **Show your work!**

4. Using the formulas we just stated, determine the number of permutations and combinations for when we select 5 cards from a set of 35 cards. **Show your work!**
Challenge Calculations with formulas:

5. Determine the number of cards to select from a set of 10 cards to obtain the largest number of permutations. In other words, find the value of $k$ that yields the most number of permutations.

6. Determine the number of cards to select from a set of 10 cards to obtain the largest number of combinations. In other words, find the value of $k$ that yields the most number of combinations.

Probability Calculations:

7. List the cards in your set of cards, such as 7♦, 2♣, J♠, A♥, etc.

8. Find the probability of first picking a card with a club and then picking a card without a number on it, replacing the cards in the stack.

9. Find the probability of first picking a card that is red suit and then picking a card that is red suit, without replacing the cards in the stack.

10. Find the probability of first picking a card with a number on it and then picking a card without a number on it, without replacing the cards in the stack. (There are two answers!)
11. Find the probability of first picking a card with an even number on it and then picking a card with an odd number on it, replacing the cards in the stack.

12. Find the probability of first picking a card with a number less than 8 and then picking a card with a number greater than 5, without replacing the cards in the stack. (There are two answers!)