

**ALGEBRA II JOURNAL**  
**Combinatorics & Probability**

1. Combinatorics is \_\_\_\_\_.
2. The fundamental counting principle states that if there are  $g$  ways to do one event and  $h$  ways to do another, then there are \_\_\_\_\_ ways to do both.
3. Combinations determine the number of \_\_\_\_\_ that can be formed from a set of objects while permutations determine the number of \_\_\_\_\_ that can be formed.
4. (a) If  ${}_{11}C_5 = 462$ , this means there are 462 ways to (*Circle one:* arrange/group) \_\_\_\_\_ objects chosen from \_\_\_\_\_ objects.  
 (b) If  ${}_9P_4 = 3024$ , this means there are 3024 ways to (*Circle one:* arrange/group) \_\_\_\_\_ objects chosen from \_\_\_\_\_ objects.
5. \_\_\_\_\_ probability is found by using known formulas to calculate the probability of an event while \_\_\_\_\_ probability is found by performing or simulating the event many times and analyzing the results of each outcome.
6. (a) Independent events: The outcome of the 2<sup>nd</sup> event \_\_\_\_\_  
 Example of independent events: \_\_\_\_\_  
 (b) Dependent events: The outcome of the 2<sup>nd</sup> event \_\_\_\_\_  
 Example of dependent events: \_\_\_\_\_
7. (a) Mutually exclusive events are events which \_\_\_\_\_  
 Example of mutually exclusive events: \_\_\_\_\_  
 (b) Mutually inclusive events are events which \_\_\_\_\_  
 Example of mutually inclusive events: \_\_\_\_\_
8. To calculate the odds of an event in which multiple items are selected, you must first \_\_\_\_\_  
 \_\_\_\_\_.
9. (a) When calculating the probability of an event, you know to use combinations when \_\_\_\_\_ of the following are true:  
 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_  
 (b) You should use individual probabilities when \_\_\_\_\_ of the following are true:  
 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_
10. To calculate the probability of one event OR another you should \_\_\_\_\_ the probabilities while you should \_\_\_\_\_ the probabilities to calculate the probability of one event AND another.
11. (a) When calculating the probability of one event OR another you must be careful to watch for \_\_\_\_\_  
 \_\_\_\_\_  
 (b) When calculating the probability of an event with AT LEAST or AT MOST, you must \_\_\_\_\_  
 \_\_\_\_\_.
12. (a) The purpose of the binomial expansion theorem is \_\_\_\_\_  
 \_\_\_\_\_.

(b) You know to use binomial probability when:

1. \_\_\_\_\_ 2. \_\_\_\_\_

13. Conditional probability is \_\_\_\_\_

14. (a) The expected value of a situation is calculated by \_\_\_\_\_.

(b) The expected value of a situation describes the \_\_\_\_\_.

15. Identify the probability method which should be used to solve each of the following situations.  
Choices are: Combinations, Individual probabilities, Combinations (subtract duplicates), Binomial probability, Conditional probability (A|B)

a) Items must be selected in a certain order \_\_\_\_\_

b) Probability of performing an event 7 out of 10 times \_\_\_\_\_

c) Probability of selecting 3 items & replacing the item after each selection \_\_\_\_\_

d) Probability of selecting 2 items from Box A and 3 items from Box B \_\_\_\_\_

e) Probability of selecting a customer if you know the customer is female \_\_\_\_\_

f) Probability of selecting 2 NC males OR 2 NC football players \_\_\_\_\_

16. List the following rules, facts, or formulas.

a) Formulas for how  ${}_nP_r$  and  ${}_nC_r$  are calculated with factorials

b) Rules for calculating the number of linear permutations of a group of objects

All objects

Small group chosen from a larger group

Alike objects

Repeated objects or specific locations

c) Definitions of probability and odds

d) Formula for calculating conditional probability

e) Construct the first 7 rows of Pascal's Triangle