CH.14 PROBABILITY NOTES **NAME:** **PER:**

basic counting principle

If ***event 1 can*** occur ***m*** different ways and ***event 2 can*** occur ***n*** different ways (after the first has occurred), then the two events can occur ***m•n*** ways.

→Use a decision chart to compute your answer by filling in appropriate values based on given information!

____ · ____ · ____ · ____

permutation

an arrangement of items in a certain order where items *cannot be repeated* (such as students sitting in a row of desks.)

The number of permutations of n objects is n!

P(n, r): the number of permutations of **n** objects taken **r** at a time.

$$P(n,r) = \frac{n!}{(n-r)!}$$

distinguishable permutation

The number of permutations of **n** objects of which **p** are alike, **q** are alike, and **r** are alike :

$$\frac{n!}{p!q!r!etc.}$$

repetitions must be accounted for

be sure to use parentheses around denominator when solving in a calculator!

combination

the order of the items is not a consideration and items *cannot be repeated* (a combination pizza or a committee of people)

$$C(n,r) = \frac{n!}{r!(n-r)!}$$

independent events

independent events do NOT affect each other (rolling dice)

dependent events do affect each other (choosing cards from a deck, no replacement)

Probability

P=

Sample Space:

P(A)

P(A′)

P(A) + P(A′) =

intersection of two events

P(A ∩ B)
same as

P(A and B) =

union of two events

P(A ∪ B) → same as P(A or B)

→mutually exclusive events

cannot happen at the same time

P(A or B) =

→NOT mutually exclusive

some objects can satisfy the conditions of both events

P(A or B) =

conditional probability

reduces the sample space since an event has already occurred

$P(A|B) =$

Standard deck of playing cards:

- **52 cards→ 4 suits**
  (spades, hearts, clubs, diamonds)
  black ♠ red ♥ black ♣ red ♦
- **Each suit has 13 cards**
- **Face cards: Jack, Queen, King**

- **Aces are low unless stated otherwise (Ace = 1)**