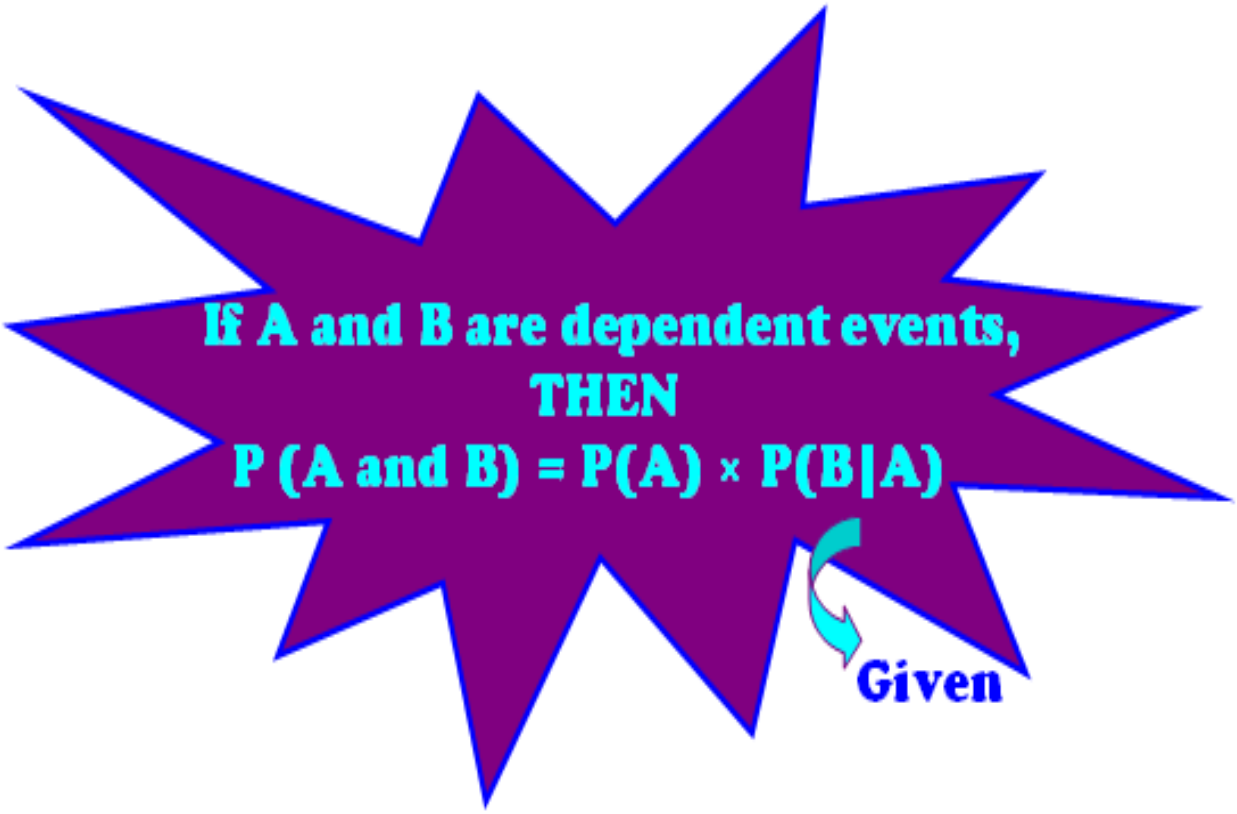
Dependent Events

It is important to understand the difference between events that are dependent and those which are independent.

If the probability of the second event is affected by the outcome of the first event, then the two events are dependent.

For example: When drawing an object from a container, you can find the probability of drawing a particular object. If you do not replace the first object before drawing the second, then the second event is dependent on the first.


If A and B are dependent events,
THEN
P (A and B) = P(A) × P(B|A)
Given

Problem A:

Three red and one white counter are placed in a bag. What is the probability of drawing two red counters, when the first one is not replaced before drawing the second?

Solution:

$$P(\text{Red and Red}) = P(\text{Red}) \times P(\text{Red}|\text{Red})$$

$$= \frac{3}{4} \times \frac{2}{3}$$

$$= \frac{6}{12}$$

$$= \frac{1}{2}$$

Problem B:

What is the probability of drawing a red followed by a white, if the first one is not replaced before drawing the second?

Solution:

$$P(\text{Red and White}) = P(\text{Red}) \times P(\text{White}|\text{Red})$$

$$= \frac{3}{4} \times \frac{1}{3}$$

$$= \frac{3}{12}$$

$$= \frac{1}{4}$$

What is the probability of drawing a 4 followed by a face card, if the first card is not replaced before drawing the second

$$P(4 \text{ and Face}) = P(4) \times P(\text{Face}|4)$$

$$= \frac{4}{52} \times \frac{12}{51}$$

$$= \frac{48}{2652}$$

$$= \frac{4}{221}$$

$$\frac{1}{13} \times \frac{4}{17}$$

$$\frac{4}{221}$$