Algebra 2H NOTES 12.5 Independent and Dependent Events

Two events are *independent* if one event has no effect on the other. Two events are *dependent* if one event affects the other.

If A and B are independent events, then P(A and B) = P(A) • P(B).
If A and B are dependent events, then P(A and B) = P(A) • $\underbrace{\text{P(B \| A)}}_{\text{P(B) depending A}}$.

Example 1 There are 3 red pens, 4 blue pens, and 5 black pens in a box.

(a) Suppose you choose 2 pens at random, one at a time with replacement. independent
Find the probability of choosing blue, then black.

$$\underset{P(Blue)}{\frac{4}{12}} \times \underset{P(Black)}{\frac{5}{12}} = \boxed{\frac{5}{36}}$$

(b) Suppose you choose 3 pens at random, one at a time without replacement. dependent
Find the probability of choosing red, then blue, then blue.

$$\boxed{\frac{3}{110}} = \overset{P(red)}{\frac{3}{12}} \times \overset{P(Blue)}{\frac{4}{11}} \times \overset{P(Blue)}{\frac{3}{10}}$$

Example 2 The probability it will rain on a certain day is 10% in Placentia and 20% in Laguna Beach. Find the probability it will rain in at least one of these cities.

Pyes & LBno OR LByes & Pno or Pyes & LByes

$$(.1)(.8) + (.2)(.9) + (.1)(.2) = .28 = 28\%$$

Example 3 In a survey of adults 35-60 years old, 45% were men. Twenty percent of the men surveyed admitted they watched infomercials, and 48% of the women admitted to watching infomercials. Use a tree diagram to find the probability that a randomly selected adult watches infomercials.

M .45 → Y .20, N .80

OR

W .55 → Y .48, N .52

M & yes ~~&~~ or W & yes

$$(.45)(.20) + (.55)(.48)$$

.354

35.4%