

Performance Objective: To Discuss Compound Events and Conditional Probability

Homework #9PR2 – NYA p.104 #1 – 22 (even), 49, 50, p.661 #1, 2, 4, 5

Do Now: The sum of two dice. 1. P(7 or 11)? 2. P(1 or even)?

State Test Prep: Out of 150 widgets, 142 passed inspection. About how many do you predict will fail inspection if there were 2885 widgets?

- a) 140 b) 150 c) 2700 d) 2850

Compound events are events that contain more than one outcome.

Sometimes the occurrence of one event affects the probability of the second event. When this happens, we say that the events are dependent, or the second event is a dependent event. If there is no effect, we say the events are independent.

Multiplication Property: $P(A \text{ and } B) = P(A) \cdot P(B)$

Independent: $P(A)$ and $P(B)$ do not influence each other, values are unaffected.

Dependent: $P(B)$ will be $P(B \text{ after } A \text{ occurs})$.

Warning: If event B is dependent upon A then $P(B)$ is not predetermined.

Example 1: Marble Bag Containing 2 Green, 4 Red, and 1 Blue.

1. You draw one marble, replace it in the bag, and draw a second marble.

A) $P(R, R) =$ C) $P(B, B) =$ E) $P(R, G) =$

B) $P(R, B) =$ D) $P(G, R) =$ F) $P(G, G) =$

G) With replacement: dependent or independent?

2. You draw one marble, hold onto it, and draw a second marble.

A) $P(R, R) =$ C) $P(B, B) =$ E) $P(R, G) =$

B) $P(R, B) =$ D) $P(G, R) =$ F) $P(G, G) =$

G) Without replacement: dependent or independent?

Standard Deck of Cards: Live and Breathe It!

52 Cards

2 Colors: 26 Red, 26 Black

4 Suits: 13 ♥, 13 ♦, 13 ♣, 13 ♠ (Hearts, Diamonds, Clubs, Spades)

Each Suit has: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K (4 faces, 9 numbers)

If ordered, the Ace can be the highest value (14) or lowest (1)

Standard Deck Practice: Pick Two Cards

With Replacement	Without Replacement
$P(2\clubsuit, \text{ any } \heartsuit) =$	$P(2\clubsuit, \text{ any } \heartsuit) =$
$P(\text{black, red}) =$	$P(\text{black, red}) =$
$P(\text{red K, any } \heartsuit) =$	$P(\text{red K, any } \heartsuit) =$
$P(\text{black Q, any } \diamondsuit) =$	$P(\text{black Q, any } \diamondsuit) =$

Independent or Dependent: No Calculations!

- a) A die is rolled twice.
- b) Choose a marble, replace it, and then choose a second.
- c) Your birthday is today and you have a birthday party.
- d) Two children are born – a girl, then a boy.
- e) It is raining and a parade is cancelled.
- f) You wear an Oakland Raiders cap, and the Raiders win.
- g) You were born on May 27th, and another person was born on May 27th.

Example: Conditional Probability

- When the hunter shoots at a target at 20 ft. or less, he hits 90% of the time.
 - When the hunter shoots at a target more than 20 ft., he hits 65% of the time.
 - The hunter shoots at a target more than 20 ft. away 75% of the time.
1. $P(\text{Hit: target 17 ft.}) =$
 2. $P(\text{Hit: target 30 ft.}) =$
 3. $P(\text{Miss: target 50 ft.}) =$
 4. $P(\text{Miss: target 5 ft.}) =$

Tree Diagram Illustrating the Hunter's Hit Probability

