Independent and Dependent Events Notes Sheet

Vocabulary

Compound Event – **two or more simple events**

Independent Events – **two events are independent if the outcome of the first event does not affect the second event**

Dependent Event – **two events are dependent if the outcome of the first event affects the outcome of the second even**

Guided Practice

Determine whether the events are *independent* or *dependent*. Explain your reasoning.

1. One coin is tossed, and then a second coin is tossed.
   Independent. There is no relationship between the first coin toss and the second coin toss.

2. Wednesday's lottery numbers and Saturday's lottery numbers.
   Independent. After wednesdays lottery numbers are drawn the balls are reset, so there is no relationship between the drawings

3. Jared selects a shirt from his closet to wear on Monday and then a different shirt to wear on Tuesday.
   Dependent. The shirt that Jared selects on Monday he will not wear on Tuesday, so there is a relationship between the shirt choices.

Your Turn

4. A card is selected from a deck of cards and not put back. Then a second card is selected.
   Dependent. Since the first card selected is not returned, then the possible cards to choose from is different for the second choice.
   ✯ This is a common question for dependent and independent probability. ✯

5. A die is rolled, and then a second die is rolled.
   Independent. One roll of a die does not matter for the chances of the second roll of the die.

Probability of Two Independent Events	
Define	**The probability that two independent events occur is the product of the probabilities of each event**
Symbols	**A and B are Independent Events** $P(A \text{ and } B) = P(A) \cdot P(B)$

Guided Practice

6. Eric and his friends are going to a concert. They put three blue and five yellow slips of paper into a bag. If a person draws a yellow slip, he or she will ride in the van to the concert. A blue slip means he or she rides in the car.
   Suppose Eric draws a slip. Not liking the outcome, he puts it back and draws a second time. What is the probability that on each draw his slip is blue?

   Since the slip is returned this is Independent.

   3 blue + 5 yellow = 8 total slips

   $P(\text{blue and blue}) = \frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$ or 14.1% chance of Eric picking blue twice

Your Turn

7. Brad and Rick are going out to lunch. They put 5 green slips of paper and 6 red slips of paper into a bag. If a person draws a green slip, they will order a hamburger. IF they draw a red slip, they will order a pizza.
   Suppose that Brad draws a slip. Not liking the outcome, he puts it back and draws a second time. What is the probability that on each draw his slip is green?

Like the last problem, since Brad returns the slip this is independent.

5 green + 6 red = 11 total slips

$P(\text{green and green}) = \frac{5}{11} \times \frac{5}{11} =$ $\frac{25}{121}$ or 20.7% chance Brad chooses two green slips

Probability of Two Dependent Events	
Define	**The probability that two dependent events both occur is the product of the probability that the first event occurs and the probability that the second event occurs after the first event has already occurred.**
Symbols	**A and B are Dependent Events** $P(A \text{ and } B) = P(A) \cdot P(B\|A)$

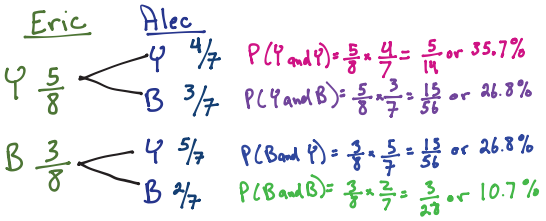
Conditional Probability - **$P(B|A)$ is the probability that B will occur given that A has already occurred**

Probability Tree – **a way of diagramming dependent events**

Guided Practice

8. Using the example with Eric and the concert. Supposed Eric draws a slip and does not put it back. Then his friend Alec draws a slip. What is the probability that both friends draw a yellow slip?

Probability Tree



For both friends to get yellow slips you will find P(Y and Y)

$P(\text{Y and Y}) = \frac{5}{8} \times \frac{4}{7} =$ $\frac{5}{14}$ or 35.7% chance both choose yellow slips

Your Turn

9. Using the example with Brad and Rick eating lunch. Suppose Brad draws a slip and does not put it back. Then Rick draws a slip. What is the probability that both will draw a green slip?

$P(\text{green and green}) = \frac{5}{11} \times \frac{4}{10} =$ $\frac{2}{11}$ or 18.1% chance both get green slips