Inspiring Greatness

ISD

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Probability and Statistics

May 15, 2020

Probability and Statistics
Lesson: May 15, 2020

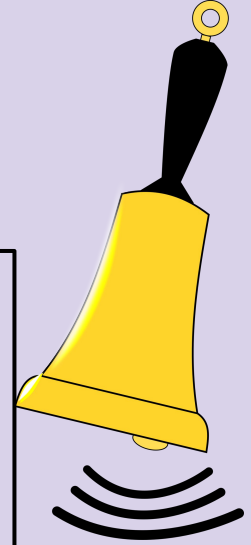
Objective/Learning Target:

Students will be able to find the probability of Compound Events - whether they are an Intersection or Union of events - Day 2

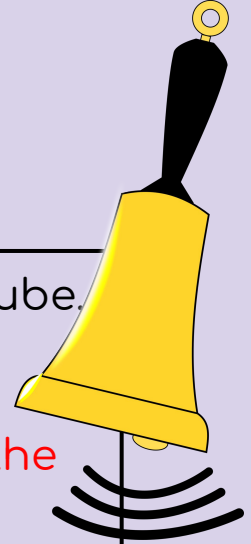
Let's Get Started!

I am running an experiment where I flip a coin and then roll a number cube.

- What does the notation P(H U 6) mean?
- What does the notation P(T ∩ Even) mean?
- Calculate P(H U 6)
- Calculate P(T ∩ Even)



Let's Get Started! ANSWERS



I am running an experiment where I flip a coin and then roll a number cube.

- What does the notation P(H U 6) mean?
  This means it is a UNION probability. Therefore we are looking for the chances of flipping a Heads OR rolling a 6.
- What does the notation P(T ∩ Even) mean?
  This means it is an INTERSECTION probability. Therefore we are looking for the chances of flipping a Tails AND rolling an even number.
- Calculate P(H U 6)
  P(H) = ½ P(6) = ⅙ P(H U 6) = ½ + ⅙ = ⅔
- Calculate P(T ∩ Even)
  P(T) = ½ P(Even) = ½ P(T ∩ Even) = ½ * ½ = ¼

Practice #1

A card is drawn from a deck of 10 cards numbered 1-10 and a 6 sided die is rolled.

- Would these be Independent or Dependent Events?
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #1 ANSWER

A card is drawn from a deck of 10 cards numbered 1-10 and a 6 sided die is rolled. Find the probability of drawing card 10 and rolling a 3.

- Would these be Independent or Dependent Events?
  Independent (cards and dice don't affect each other)
- Would this be an Intersection or Union probability?
  Intersection (uses "and")
- Would you add or multiply the probabilities? **Multiply**
- Find the probability of the event
  P(10) = 1/10 P(3) = 1/6 P(10 ∩ 6) = 1/10 * 1/6 = 1/60

Practice #2

Jackie has a box of mixed spring flower bulbs containing 12 daffodils, 10 hyacinths, and 14 tulips. Jackie reaches into the box, randomly chooses a bulb, plants it, then chooses another, and plants it. What is the probability that the first bulb Jackie plants is a daffodil and the second is a hyacinth?

- Would these be Independent or Dependent Events?
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #2 ANSWER

Jackie has a box of mixed spring flower bulbs containing 12 daffodils, 10 hyacinths, and 14 tulips. Jackie reaches into the box, randomly chooses a bulb, plants it, then chooses another, and plants it. What is the probability that the first bulb Jackie plants is a daffodil and the second is a hyacinth?

- Would these be Independent or Dependent Events?
  Dependent (because the 1st bulb is planted and not put back in the box)
- Would this be an Intersection or Union probability?
  Intersection (because of "and")
- Would you add or multiply the probabilities?
  Multiply
- Find the probability of the event
  P(D) = 12/36 P(H) = 10/35
  P(D ∩ H) = 12/36 * 10/35 = 120/1260 = 2/21

Practice #3

You placed two advertisements in a small 12 page magazine. The ads were placed on pages 3 and 9. What is the probability that, if a customer randomly opens the magazine, he or she will open to a page where your advertisement can be seen?

- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #3 ANSWER

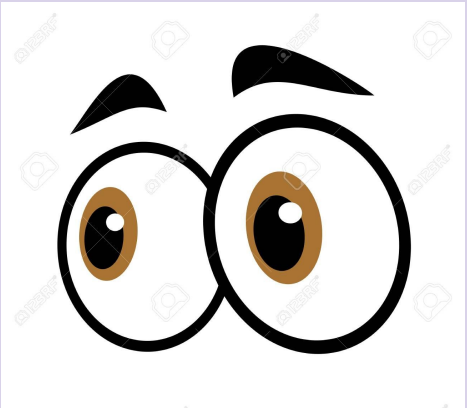
You placed two advertisements in a small 12 page magazine. The ads were placed on pages 3 and 9. What is the probability that, if a customer randomly opens the magazine, he or she will open to a page where your advertisement can be seen?

- Would this be an Intersection or Union probability?
  UNION (because landing on either page will be successful - you don't need both)
- Would you add or multiply the probabilities?
  Add
- Find the probability of the event
  P(page 3) = 1/12 P(page 9) = 1/12
  P(3 U 6) = 1/12 + 1/12 = 2/12 = 1/6

Practice #4

In a group of 92 students, 40 have brown eyes and 35 have hazel eyes. 20 students have both brown eyes and blue eyes. Find the probability that a student picked from this group at random either has hazel or brown eyes.

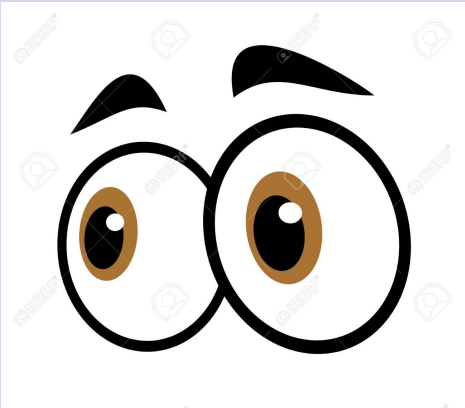
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event



Practice #4 ANSWER

In a group of 92 students, 40 have brown eyes and 35 have hazel eyes. 20 students have both brown eyes and blue eyes. Find the probability that a student picked from this group at random either has hazel or brown eyes.

- Would this be an Intersection or Union probability?
  Union (because of the words "either/or")
- Would you add or multiply the probabilities? ADD
- Find the probability of the event
  P(Brown Eyes) = 40/92
  P(Blue Eyes) = 35/92
  P(Brown U Blue) = 40/92 + 35/92 = 75/92
  BUT - 20 of those had both and were counted twice so we need to take that double count out
  75 = 20 = 55...P(Brown U Blue) = 55/92



Practice #5

A box of fruit contains 5 oranges, 3 bananas, 6 plums and 2 apples. James is packing his lunch and will include 2 pieces of fruit. What is the probability that he will randomly pick an apple and then a banana?

- Would these be Independent or Dependent Events?
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #5 ANSWER

A box of fruit contains 5 oranges, 3 bananas, 6 plums and 2 apples. James is packing his lunch and will include 2 pieces of fruit. What is the probability that he will randomly pick an apple and then a banana?

- Would these be Independent or Dependent Events?
  Dependent (because the 1st piece of fruit is packed into the lunch & not put back in the box)
- Would this be an Intersection or Union probability?
  Intersection (because of "and")
- Would you add or multiply the probabilities?
  Multiply
- Find the probability of the event
  P(A) = 2/16 P(B) = 3/16
  P(A ∩ B) = 2/16 * 3/16 = 6/256 = 3/128

Practice #6

A local charity is hosting a fundraiser. When you purchased your entry ticket it was printed on red paper with the number 10 in the corner. Upon arrival you realized that the fundraiser is giving away a cruise. They will spin the spinner below and then draw a number between 1 and 30 out of a hat. If the color and number match your ticket, you win a cruise. What is the probability that you will win?

- Would these be Independent or Dependent Events?
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #6 ANSWER

A local charity is hosting a fundraiser. When you purchased your entry ticket it was printed on red paper with the number 10 in the corner. Upon arrival you realized that the fundraiser is giving away a cruise. They will spin the spinner below and then draw a number between 1 and 30 out of a hat. If the color and number match your ticket, you win a cruise. What is the probability that you will win?

- Would these be Independent or Dependent Events?
  Independent (because the the spinner and hat of numbers are two separate things)
- Would this be an Intersection or Union probability?
  Intersection (because of "and")
- Would you add or multiply the probabilities?
  Multiply
- Find the probability of the event
  P(R) = 1/6 P(10) = 1/30
  P(A ∩ B) = 1/6 * 1/30 = 1/180 = 0.5% of winning

Practice #7

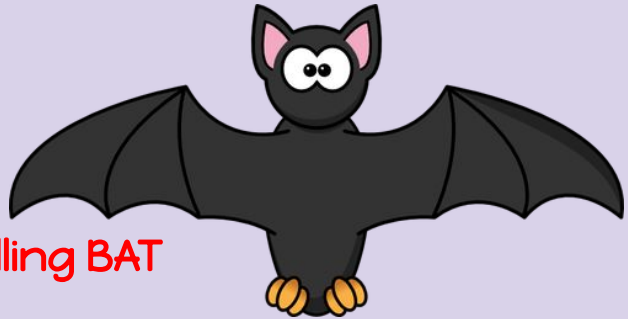
The letters to the word PROBABILITY were cut up and put into a bag. Three of the letters will be drawn at random and not replaced into the bag. What is the probability that the letters drawn in order will spell BAT?

- Would these be Independent or Dependent Events?
- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #7 ANSWER

The letters to the word PROBABILITY were cut up and put into a bag. Three of the letters will be drawn at random and not replaced into the bag. What is the probability that the letters drawn in order will spell BAT?

- Would these be Independent or Dependent Events?
  Dependent (because the letters are not replaced after being drawn)
- Would this be an Intersection or Union probability?
  Intersection (because the order has to be B and then A and then T)
- Would you add or multiply the probabilities?
  Multiply
- Find the probability of the event
  P(B) = 2/11 P(A) = 1/10 P(T) = 1/9
  P(B ∩ A ∩ T) = 2/11 * 1/10 * 1/9 = 2/990 = 0.2% of spelling BAT



Practice #8

In a group of 100 people, 19 were drinking punch and 23 were eating goldfish crackers. None of the people were eating both. Find the probability that a person picked from this group at random is either drinking punch or eating goldfish.

- Would this be an Intersection or Union probability?
- Would you add or multiply the probabilities?
- Find the probability of the event

Practice #8

In a group of 100 people, 19 were drinking punch and 23 were eating goldfish crackers. None of the people were eating both. Find the probability that a person picked from this group at random is either drinking punch or eating goldfish.

- Would this be an Intersection or Union probability?
  UNION because of the "or"
- Would you add or multiply the probabilities? ADD
- Find the probability of the event
  19/100 + 23/100 = 42/100 = 21/50