Math 2311

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Office Hours: MW 11am to 12:45pm in 639 PGH

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Class webpage: http://www.math.uh.edu/~bekki/Math2311.html

#21 from text:

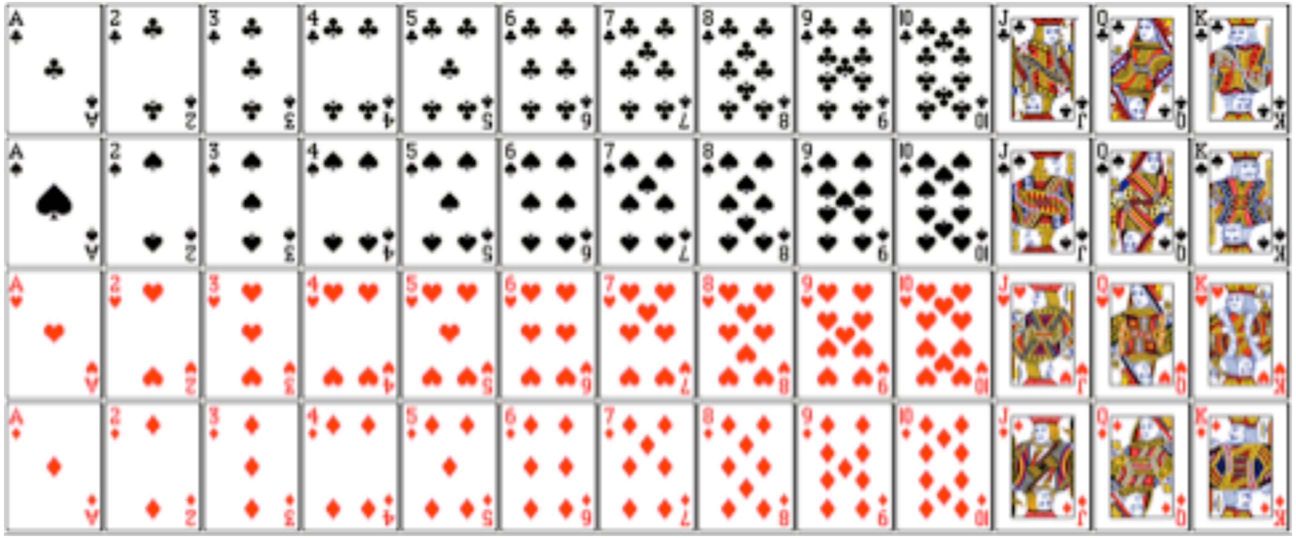
Thirty percent of the students at a local high school face a disciplinary action of some kind before they graduate. Of those "felony" students, 40% go on to college. Of the ones who do not face a disciplinary action, 60% go on to college.

a. What is the probability that a randomly selected student both faced a disciplinary action and went on to college?

b. What percent of the students from the high school go on to college?

c. Show if events {faced disciplinary action} and {went to college} are independent or not.

Suppose you are playing poker with a standard deck of 52 cards:



How many 5 card hands are possible?

How many ways can you get 4 kings in a hand?

How many ways can you have any 4 of a kind hand?

What is the probability of getting 4 of a kind?

How many ways can you have 3 kings and 2 fives?

How many ways can you get a full house?

What is the probability of getting a full house?

Problems from Quiz 2:

A researcher randomly selects 2 fish from among 10 fish in a tank and puts each of the 2 selected fish into different containers. How many ways can this be done?

An experimenter is randomly sampling 4 objects in order from among 61 objects. What is the total number of samples in the sample space?

How many license plates can be made using 3 digits and 4 letters if repeated digits and letters are not allowed?

Let $A = \{2, 7\}$, $B = \{7, 16, 22\}$, $D = \{34\}$ and S = sample space = $A \cup B \cup D$. Find $(A^c \cap B^c)^c$.

In a shipment of 71 vials, only 13 do not have hairline cracks. If you randomly select one vial from the shipment, what is the probability that it has a hairline crack?

In a shipment of 54 vials, only 16 do not have hairline cracks. If you randomly select 3 vials from the shipment, what is the probability that none of the 3 vials have hairline cracks?

The probability that a randomly selected person has high blood pressure (the event H) is $P(H) = 0.4$ and the probability that a randomly selected person is a runner (the event R) is $P(R) = 0.3$. The probability that a randomly selected person has high blood pressure and is a runner is 0.2. Find the probability that a randomly selected person either has high blood pressure or is a runner or both.

Hospital records show that 16% of all patients are admitted for heart disease, 26% are admitted for cancer (oncology) treatment, and 8% receive both coronary and oncology care. What is the probability that a randomly selected patient is admitted for coronary care, oncology or both? (Note that heart disease is a coronary care issue.)

What is the probability that a randomly selected patient is admitted for something other than coronary care?

Section 3.1

A **random variable** is a variable whose value is a numerical outcome of a random phenomenon. It assigns one and only one numerical value to each point in the sample space for a random experiment.

A **discrete random variable** is one that can assume a countable number of possible values
A **continuous random variable** can assume any value in an interval on the number line.

A **probability distribution table of *X*** consists of all possible values of a discrete random variable with their corresponding probabilities.

Example: Suppose a family has 3 children. Show all possible gender combinations:

Now suppose we want the probability distribution for the number of girls in the family.

Draw a probability distribution table for this example.

Find $P(X > 2)$ $P(X < 1)$ $P(1 < X \leq 3)$

The mean, or **expected value**, of a random variable X is found with the following formula

$$\mu_X = E[X] = x_1 p_1 + x_2 p_2 + \cdots + x_n p_n$$

What is the expected number of girls in the family above?

The variance of a random variable X can be found using the following:

$$\sigma_X^2 = Var[X] = (x_1 - \mu_X)^2 p_1 + (x_2 - \mu_X)^2 p_2 + \cdots + (x_n - \mu_X)^2 p_n$$

$$= \sum (x_i - \mu_X)^2 p_i$$

An alternate formula is:

$$\sigma_X^2 = Var[X] = E[X^2] - (E[X])^2$$

Find the **standard deviation** for the number of girls in the example above.