KEYS ON W.A.

If it is before 8:44, please come to the front of the room to pick up your exam and quizzes.

Please note we do NOT have class next Friday as it is Good Friday. We actually get the day back on Tuesday, May 5th.

If you forgot your clicker, write your name and date on a piece of paper and turn it in with your clicker answers at the end of class.

Warm-up question: If you have the letters AGGIE in a bowl and pick one at random, what is the probability that you choose an I? _____% (enter as a percent)

$S = \{A, G, G, I, E\}$ $n(S) = 5$

$S = \{A, G, I, E\}$ IS NOT UNIFORM

A sample space in which each of the outcomes has the same chance of occurring is called a UNIFORM SAMPLE SPACE.

The probability of an event, $P(E)$ is a number between 0 and 1, inclusive. If $P(E)=0$, then the event E is impossible. If $P(E)=1$, then the event E is certain.

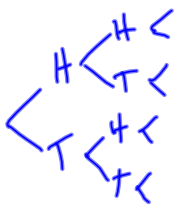
The ***theoretical probability*** of an event E occurring is based on the sample space S having equally likely outcomes. Then probability of the event E occurring is

$$P(E)=\frac{\text{number of outcomes in event E}}{\text{number of outcomes in the sample space}}=\frac{n(E)}{n(S)}$$

$\frac{2}{1^{st}} \cdot \frac{2}{2^{nd}} \cdot \frac{2}{3^{rd}} = 8 \Rightarrow n(S)=8$

Example: Consider flipping a fair coin three times. What is the uniform sample space?

$S=\{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}$



(a) What is the probability that exactly one head is seen? $\frac{3}{8}$

(b) What is the probability that two or more heads are seen? $\frac{4}{8}$

(c) What is the probability that more than 3 heads are seen? 0

Consider the uniform sample space $S=\{s_1,s_2,\ldots,s_n\}$, with n outcomes. The n events that contain a single outcome, $\{s_1\}$, $\{s_2\}$ . . . $\{s_n\}$ are called ***simple*** events. $P(s_1)=1/n$, $P(s_2)=1/n$, ... $P(s_n)=1/n$

A ***probability distribution table*** has the following properties:

1. Each of the entries is mutually exclusive with all other entries
2. The sum of the probabilities is 1

PROBABILITY DISTRIBUTION TABLE:

Event	probability
s_1	$1/n$
s_2	$1/n$
⋮	
s_n	$1/n$

Example

Find the probability distribution table for the number of heads when a coin is tossed 3 times.

Event	Prob
0H	1/8
1H	3/8
2H	3/8
3H	1/8

add to 1

What is the probability of 2 or more heads?

$\frac{3}{8}+\frac{1}{8}=\frac{4}{8}$

A class has 150 students and the maximum grade possible in this class is 100. Eleven students had a grade of 90 or more. Forty-one students had grades of 80 or more. Fifty-seven students had a grade that was greater than or equal to 60 but less than 70. Ten students had grades less than 60.

Arrange this information a probability distribution table

x = grade in the class

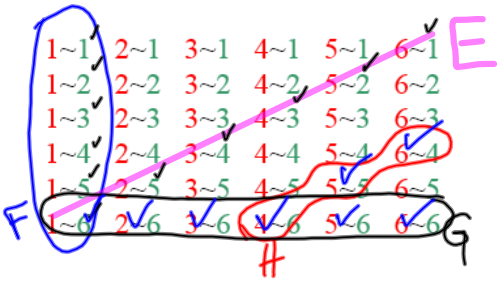
(Event)

GRADE	FREQ	PROB
$90 \le x \le 100$	11	11/150
$80 \le x < 90$	41-11=30	30/150
$70 \le x < 80$	42	42/150
$60 \le x < 70$	57	57/150
$x < 60$	10	10/150

the relative freq is the EMPIRICAL PROB.

150 - 11 - 30 - 57 - 10

Two fair six-sided dice are rolled. One is red and one is green.



$P(H \cup F) =$ 9 / 36

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

What is the probability of rolling a sum 2 or a sum of 12? 2 / 36

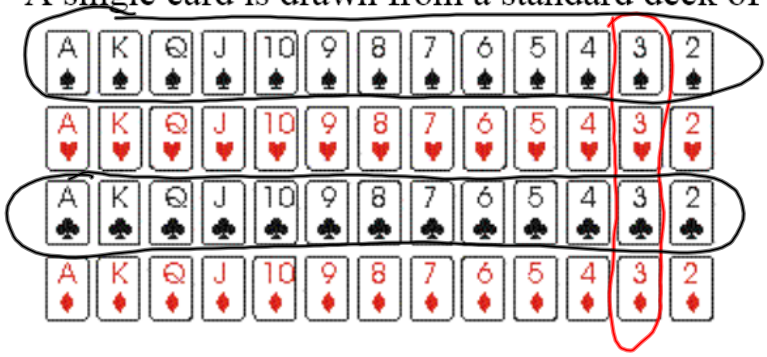
E is the event that the sum of the numbers shown uppermost is 7
F is the event that the red die shows a 1
G is the event that the green die shows a 6
H is the event that the sum of the numbers shown uppermost is 10

(a) $P(E \cup F) =$ 11 / 36

(b) $P(G \cup H) =$ 8 / 36

(c) $P(H \cup F) =$ _____ / 36

A single card is drawn from a standard deck of cards.



$P(9 \text{ or } 10) = \frac{4}{52} + \frac{4}{52} - \frac{0}{52}$

a) What is the probability that a 9 or a 10 is drawn? 8 / 52

b) What is the probability that a black card or a 3 is drawn? 28 / 52

$\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52}$

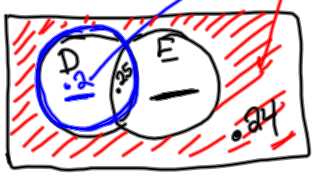
$P(A) + P(A^c) = 1$

A survey gave the following results: 45% of the people surveyed drank diet drinks (D) and 25% drank diet drinks and exercised ($D \cap E$) and 24% did not exercise and did not drink diet drinks ($D^c \cap E^c$). Find the probability that:

a) a person does not drink diet drinks $P(D^c)$ = 55 %

b) does not exercise and drinks diet drinks $P(E^c \cap D)$ = ____ %

c) exercises and does not drink diet drinks $P(E \cap D^c)$ = ____ %



$P(D) = .45$ or 45%