

Grab a Bell Ringer and Hw Tracker!

Monday 4/29

Link

Watch the following video: <https://www.youtube.com/watch?v=21ioywVyjrY>



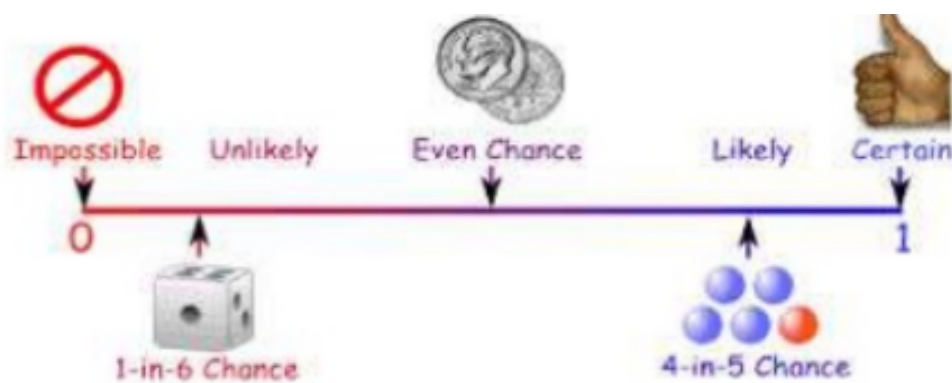
What are three ways to improve in mathematics?

- 1.
- 2.
- 3.

Choose one strategy you would like to try and list it here:

SAGE Reviews #1 and #2 due tomorrow

Probability...



Definitions

- Outcome = the result of an experiment.
- Sample Space = the set of all possible outcomes.
- Event = any collection of outcomes of an experiment (Subset of the sample space).

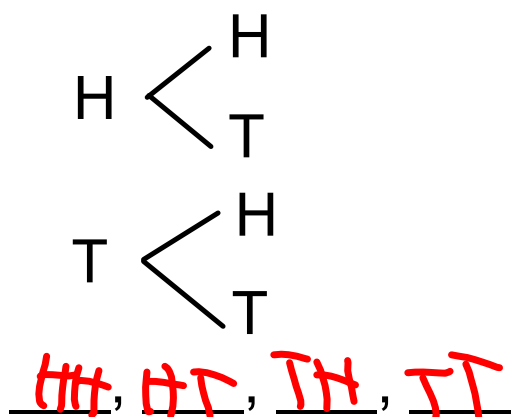
$P(\text{Event})$

Experimental vs Theoretical Probability

- Experimental Probability = probability that actually occurs in a real life experiment.
- Theoretical Probability = probability that should occur in a perfect world.
- Probability Complement = probability that an event will not occur.

Sample space - flipping a coin twice

Tree Diagram



Two-Way Table

		Flip 2	
		H	T
Flip 1	H	HH	HT
	T	TH	TT

$\frac{1}{4}$

At the ice cream store, they are giving out a free cup of ice cream that includes 1 sauce and 1 topping. There is chocolate or vanilla ice cream with caramel or hot fudge. On top of that, there are peanuts, sprinkles, oreos or strawberries. Make a tree diagram that represents all possible combinations, then calculate the following probabilities if you were to randomly select one cup of ice cream.

$2 \cdot 2 \cdot 4 = 16$

$P(\text{chocolate}) = \frac{8}{16} = \frac{1}{2} = .5 = 50\%$ ✓
 $P(\text{vanilla and hot fudge}) = \frac{4}{16} = \frac{1}{4} = 25\%$
 $P(\text{chocolate, caramel and oreo}) = \frac{1}{16} = .0625 = 6.25\%$

16 options

$P(\text{caramel}) = \frac{8}{16}$

CCP, CCS, CCO, CLB
 CTP, CHS, CTB, CTB

The digits 1-8 are written on cards and placed in a hat from which they are randomly drawn. Find the following probabilities:

$$\text{Theoretical Probability} = \frac{\text{Number of favorable (desired) outcomes}}{\text{Total number of possible outcomes}}$$

1, 2, 3, 4, 5, 6, 7, 8

P(2)

$$\frac{1}{8} = 12.5\%$$

P(even)

$$\frac{4}{8} = \frac{1}{2} = 50\%$$

P(less than 7)

$$\frac{6}{8} = \frac{3}{4} = 75\%$$

P(9)

$$0\%$$

P(not 2)

$$\frac{7}{8} = 87.5$$

P(not even)

$$\frac{4}{8} = 50\%$$

P(not less than 7)

$$\frac{2}{8} = \frac{1}{4} = 25\%$$

P(not 9)

$$100\%$$

$$1 - \frac{1}{8} = \frac{7}{8}$$

Complement

$$P(A') = 1 - P(A)$$

The probability that something won't happen is
(1 - the probability that it will happen)

You randomly draw one card... Find the following probabilities:

Standard Deck of 52 Playing Cards



Face Cards



4 Suits



$$P(7) = \frac{4}{52} = 7.7\%$$

$$P(\text{Red}) = \frac{26}{52} = \frac{1}{2} = 50\%$$

$$P(\text{Face Card}) = \frac{12}{52} = 23.1\%$$

$$P(\text{Diamond}) = \frac{13}{52} = \frac{1}{4} = 25\%$$

$$P(\text{Black Ace}) = \frac{2}{52} = 3.8\%$$

Area model

There's a 40% chance it will rain on Monday, and a 70% chance it will rain on Tuesday. Put the data in an area model to calculate the following probabilities...

$$\begin{aligned}
 P(\text{rain Mon only}) &= 12\% \\
 P(\text{rain Mon and Tues}) &= 28\% \\
 P(\text{rain Tues only}) &= 42\% \\
 P(\text{no rain}) &= 18\%
 \end{aligned}$$

...

		Tues	
		Rain (.7)	No rain (.3)
Mon	Rain (.4)	.28	.12
	No Rain (.6)	.42	.18

State the sample space for each of the following events. Remember the sample space is a list of all possible outcomes for the event. Please try and use either an area model or a tree diagram to help construct the sample space. Please explain why you chose the method used.

2. Event: Roll two dice and record their sum.

die 1

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

die 2

1

5. Use question #2 to answer the following.

- a) In a standard casino dice game the roller wins on the first roll if he rolls a sum of 7 or 11. What is the probability of winning on the first roll?

$$\frac{8}{36} = 22\% \\ \frac{2}{9}$$

- b) The player loses on the first roll if he rolls a sum of 2, 3, or 12. What is the probability of losing on the first roll?

$$\frac{4}{36} = \frac{1}{9} = 11\% \\ 11.1\%$$

- c) If the player rolls any other sum, he continues to roll the dice until the first sum he rolled comes up again or until he rolls a 7, whichever happens first. What is the probability that the game continues after the first roll?

$$\frac{24}{36} \quad \frac{2}{3} = 66\% \\ 66.6$$

$$1 - \text{Prob doesn't continue} \\ 1 - \frac{2}{9} = \frac{6}{9} = \frac{2}{3} = 66\%$$

7. Rimshot McGee has a 70% free throw average. The opposing team is ahead by one point. Rimshot is at the foul line in a one-and-one situation with just seconds left in the game. (A one-and-one situation means that the player shoots a free throw. (If he makes the shot, he is allowed to shoot another. If he misses the shot, he gets no second shot. Each shot made is worth one point.)
- a) Take a guess. What do you think is the most likely outcome for Rimshot (use the sample space from question #3 to help if necessary)?

For sure make 1 or both

- b) Jeremy is working on the problem with Jenna and he remembers that area models are sometimes useful for solving problems related to probability. They set up the following area models. Which part of the model represents Rimshot getting one point? How can you use the model to help you calculate the probability that Rimshot will get exactly one point?

		2 nd shot	
		makes (0.7)	misses (0.3)
1 st shot	makes (0.7)	.49	.21
	misses (0.3)	.3	

- c) Use a model to find the probability of each outcome (0 points, 1 point, 2 points). What is the most likely of the three outcomes?

0 pts - 30%
 1 pts - 21%
 2 pts - 49%

10. What is the probability that $x^2 + 7x + k$ is factorable if $0 \leq k \leq 20$ and k is an integer?

How many different numbers could k be?

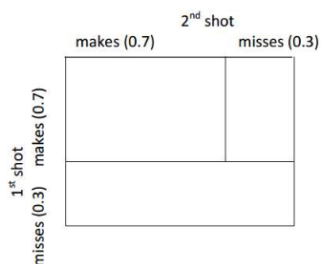
How many of those numbers are actual solutions?

5. Use question #2 to answer the following.
- In a standard casino dice game the roller wins on the first roll if he rolls a sum of 7 or 11. What is the probability of winning on the first roll?
 - The player loses on the first roll if he rolls a sum of 2, 3, or 12. What is the probability of losing on the first roll?
 - If the player rolls any other sum, he continues to roll the dice until the first sum he rolled comes up again or until he rolls a 7, whichever happens first. What is the probability that the game continues after the first roll?
6. Still using question #2, in a different game of dice, you win if you roll a sum of six, lose if you roll a sum of seven. If anything else happens you ignore the results and roll again.
- How many ways are there to get a sum of six?
 - How many ways are there to get a sum of seven?
 - How many possible outcomes are important in this problem?

7. Rimshot McGee has a 70% free throw average. The opposing team is ahead by one point. Rimshot is at the foul line in a one-and-one situation with just seconds left in the game. (A one-and-one situation means that the player shoots a free throw. (If he makes the shot, he is allowed to shoot another. If he misses the shot, he gets no second shot. Each shot made is worth one point.)

a) Take a guess. What do you think is the most likely outcome for Rimshot (use the sample space from question #3 to help if necessary)?

b) Jeremy is working on the problem with Jenna and he remembers that area models are sometimes useful for solving problems related to probability. They set up the following area models. Which part of the model represents Rimshot getting one point? How can you use the model to help you calculate the probability that Rimshot will get exactly one point?



c) Use a model to find the probability of each outcome (0 points, 1 point, 2 points). What is the most likely of the three outcomes?

8. Eddie told Alfred, "I'll bet if I flip three coins I can get exactly two heads." Alfred replied, "I'll bet I can get exactly two heads if I flip four coins!" Eddie scoffed. "Well, so what? That's easier." Alfred argues, "No, it's not. It's harder." Who is correct? Show all of your work and be prepared to defend your conclusion.

