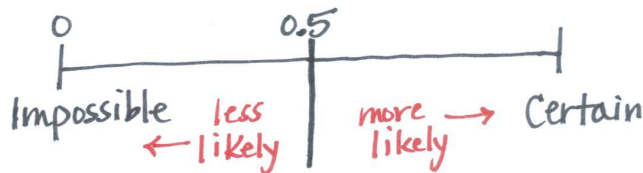


Experimental ≠ Theoretical Probability (Section 14-1)

* Probability: a numerical value from 0 to 1 that measures the likelihood of an event.

$$P(\text{event}) = \frac{\# \text{ of favorable outcomes}}{\# \text{ of possible outcomes}}$$



* Experimental Probability: based on the actual results of an experiment.

#1

ex: Baseball player
Hit: 19

At bats: 64

$P(\text{Hit}) = ?$

what if he's up 200 times?

$$P(\text{Hit}) = \frac{19}{64} = .296875 \approx \boxed{.297}$$

$$200 (.297) \approx \boxed{59 \text{ Hits}}$$

#2

ex: New cough medicine

4250 people take it

3982 people say its effective

$P(\text{effective}) = ?$

What if 9000 people take it?

$$P(\text{eff.}) = \frac{3982}{4250} = \boxed{.937}$$

$$9000 (.937) = \boxed{8432 \text{ people}}$$

* Theoretical Probability: probability of an event based on mathematical reasoning.

ex: Number Cube

$$P(9) = \frac{4}{36} = \frac{1}{9}$$

$$P(2) = \frac{1}{36}$$

$$P(13) = 0 \text{ (can't be rolled!)}$$

	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

ex: MISSISSIPPI

$$P(I) = 4/11$$

$$P(S) = 4/11$$

$$P(P) = 2/11$$

* Probability of a Complement:

$$P(\text{event}) + P(\text{not event}) = 1$$

$$\text{so... } P(\text{not event}) = 1 - P(\text{event})$$

$$\text{ex: } P(\text{Not M}) = 1 - 1/11 = 10/11$$

$$P(\text{Not P}) = 1 - 2/11 = 9/11$$

ex: 10 red, 8 green, 5 blue, 6 white marbles, pull out one marble.

$$P(\text{red}) = 10/29$$

$$P(\text{Not white}) = 1 - 6/29 = 23/29$$

$$P(\text{marble}) = 1 \text{ (certain)}$$

$$P(\text{orange}) = 0 \text{ (not possible)}$$

$$P(\text{Not yellow}) = 1 - 0 = 1$$