13.1 Experimental and Theoretical Probability

Learning Targets for today

- To be able to calculate experimental probability.
- To be able to calculate theoretical probability.
- To be able to understand the definition of probability

Vocabulary!

Probablity – A number from 0 to 1 that indicates the likelihood an event will occur.

$$P(event) = \frac{number\ of\ favorable\ outcmes}{number\ of\ total\ possible\ outcomes}$$

Ex: *There are 10 animals total in my house and 3 of them are dogs. The probability that I choose to pet one animal and it is a dog is 3/10.*

*** Probability can be written a ratio, decimal, or percent.**

$\frac{1}{2}$ .5 50%

Experimental Probablity – the likelihood that the event occurs based on the actual results of an experiment

$$P(event) = \frac{number\ of\ times\ the\ event\ occurs}{number\ of\ times\ the\ experiment\ is\ done}$$

Using Experimental Probability

Example for you…	**Your turn to try…**
Find the experimental probability of the situation below. 1. There are 84 teachers in GHHS and 52 of them are male. What is the experimental probability that the person chosen at random for the staff of the month is a male? $P(\text{male}) = \frac{52}{84} = \frac{\text{fav.}}{\text{TOTAL}}$ $= .61904$ $= .62 = 62\%$	*Find the experimental probability of the situation below.* 1. Derek Jeter got a hit 240 times out of the last 550 at bats. What is the experimental probability that he will get a hit the next time he is up to bat? $P(\text{HIT}) = \frac{240}{550} = .4363$ $= .44$ $= 44\%$

Vocabulary!

Theoretical Probablity - the likelihood of an event occurring based on mathematical reasoning.

$$P(A) = \frac{number\ of\ outcomes\ in\ Event\ A\ (m)}{total\ number\ of\ outcomes\ (n)}$$

Theoretical!

Using Experimental Probability

Example for you…	**Your turn to try…**
Find the theoretical probability of the situation below.	*Find the theoretical probability of the situation below.*
1. You roll a 3 on a standard numbered dice. $P(3) = \frac{1}{6} = .16 = .17$ = 17%	1. You draw a 10 from a standard deck of cards. $P(10) = \frac{4}{50} = .076 = .08$ = 8%
2. When picking a number between 1 and 50 you choose a perfect square. 1,4,9,16,25,36 (7 TOTAL) $P(\text{perfect square}) = \frac{7}{50} = .14$ = 14%	2. When picking a number between 1 and 50 you choose and even number. $P(\text{EVEN}) = \frac{25}{50} = \frac{1}{2} = .5$ = 50%

Probability of a Complement

Calculating the sum of the probability of an event and the probability of its complement is equal to 1.

P(event) + P(not event) = 1 OR P(not event) = 1 – P(event)

Using Probabilities of Events and their Complements

Example for you…	**Your turn to try…**
1. A jar contains 10 red marbles, 12 green marbles, and 15 blue marbles. Find the probability that a marble chosen at random is NOT blue.	1. You get to draw a card from a standard deck of cards. What is the probability that you do NOT draw a King?

$P(\text{NOT BLUE}) = 1 - P(\text{BLUE})$

$= 1 - \left(\frac{15}{37}\right)$

$= .5945 = .59$

$\approx 59\%$

$P(\text{NOT BLUE}) = \frac{22}{37} = 59\%$

$P(\text{NOT KING}) = 1 - \left(\frac{4}{52}\right)$

$= .923$

$= .92$

92%