Name Key Date_____ Hour_____

Experimental vs. Theoretical Probability
Experiment/Notes – Alg 2 Trig G

If you flip a coin, what is the probability that it lands on heads?? $\frac{1}{2}$

In your own words, what is probability??

$$\frac{\#\text{ of favorable outcomes}}{\#\text{ of total outcomes}}$$

If I flip a coin 10 times, 5 times it should land on heads and 5 times it should land on tails, correct??

Let's do an experiment…

Flip a coin 5 times and tally your results below in the first blank row below:

How many flips?	Tally		Percentage Heads	
	Heads	Tails	% Heads	%Tails
5				
15				
30				
TOTAL = 50 flips				

What if you flip the coin 15 more times? Record your results in the second row above.

What if you flip the coin 30 more times? Record your results in the third row above.

What conclusions can you make about the % of heads and the % of tails as we flip more coins??

As the # of "flips" increases, the experimental probability gets closer to the theoretical probability

What is the difference between the 50% heads and 50% tails and the percentages that you recorded above??

theoretical

experimental

Amanda used a standard deck of 52 cards and selected a card at random. She recorded the suit of the card she picked, and then replaced the card. The results are in the table below.

Diamonds	𝍸 ||	7
Hearts	𝍸 ||||	9
Spades	𝍸 𝍸 |	11
Clubs	|||	3

} 30 total

1. Based on her results, what is the experimental probability of selecting a heart?

$\frac{9}{30} = .3$

2. What is the theoretical probability of selecting a heart?

$\frac{13}{52} = .25$

3. Based on her results, what is the experimental probability of selecting a diamond

$\frac{7}{30} = .23$

4. What is the theoretical probability of selecting a diamond

$\frac{13}{52} = .25$

5. ***Why is there a difference between the experimental probability and the theoretical probabilities above??***

↑ small sample space

↑ large sample space

6. Dale conducted a survey of the students in his classes to observe the distribution of eye color. The table shows the results of his survey.

Eye color	Blue	Brown	Green	Hazel
Number	12	58	2	8

= 80 total

a. Find the experimental probability distribution for each eye color.

P (blue) = $\frac{12}{80} = .15$ P (brown) = $\frac{58}{80} = .73$ P (green) = $\frac{2}{80} = .03$ P (hazel) = $\frac{8}{80} = .10$

b. Based on the survey, what is the experimental probability that a student in Dale's class has blue or green eyes? (or → add) $.15 + .03 =$ **.18**

c. Based on the survey, what is the experimental probability that a student in Dale's class does not have green or hazel eyes? (must have blue or brown) $.15 + .73 =$ **.88**

d. If the distribution of eye color in Dale's grade is similar to the distribution in his classes, about how many of the 360 students in his grade would be expected to have brown eyes? ↓ .73

$360 \cdot .73 =$ **263 people**