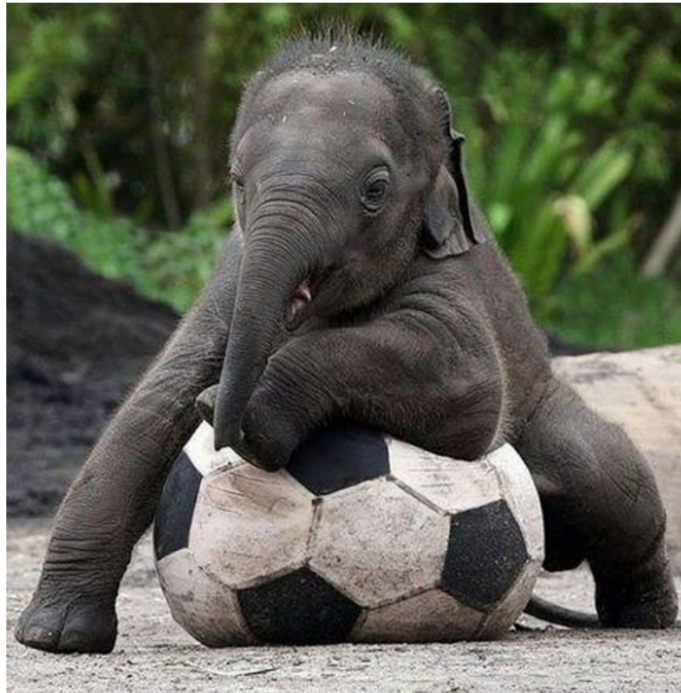


April 30, 2015<sup>1st</sup><sub>2nd</sub>

Get out your homework



Mandingo

## 4/30 Experimental and Theoretical Probability

When you conduct an experiment, the **relative frequency** of an event is the fraction or percent of the time that the event occurs.

$$\text{relative frequency} = \frac{\text{number of times the event occurs}}{\text{total number of times you conduct the experiment}}$$

# of time an event  
happens in an experiment  

---

total # of times

With a partner, flip a coin 20 times and record the results.

	Flipping Heads	Flipping Tails
Relative Frequency		



Combine all of the results of the class. What do you notice?

Heads      96  
 6  
 10  
 15  
 9  
 10  
 10  
 11

Tails      104  
 14  
 10  
 19  
 10  
 11  
 11  
 10

What if everyone in the school did the experiment, what do you think you would see?

You have a bag of colored chips. In an experiment, you randomly select a chip from the bag and replace it. The table shows the number of times you select each color.

Red	Blue	Green	Yellow					
24	+	12	+	15	+	9	=	60



If there are 20 chips in the bag, how can you use the table to find the exact number of each color in the bag? Explain.

Green!

$$\frac{15}{60} = \frac{3 \cdot X}{3 \cdot 20}$$

$$\frac{15}{3} = \frac{3X}{3}$$

$$\textcircled{5} = X$$

If you toss thumb tack onto a table, there are two ways the thumbtack can land.

**True or False?**

Because there are two outcomes, the probability of the thumbtack landing point up must be  $1/2$ .



Point up

On its side

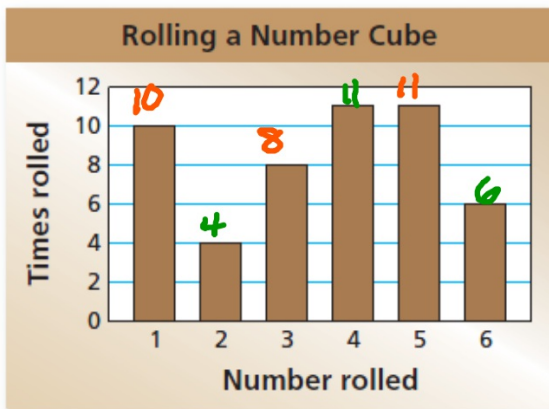
**Explain.**

False, there is not an equal chance of getting either possible outcome.

### **Experimental Probability**

Probability that is based on repeated trials of an experiment is called **experimental probability**.

$$P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{total number of trials}}$$



The bar graph shows the results of rolling a number cube 50 times. What is the experimental probability of rolling an odd number?

$$\frac{29}{50}$$

What is the experimental probability of rolling an even number?

$$\frac{21}{50}$$



"April showers bring May flowers." Old Proverb, 1557

It rains 2 out of the last 12 days in March. If this trend continues, how many rainy days would you expect in April?

$$\frac{2}{12} \propto \frac{n}{30}$$

$$\frac{12n}{12} = \frac{60}{12}$$

$$n = 5 \text{ rainy days}$$

At a clothing company, an inspector finds 5 defective pairs of jeans in a shipment of 200. If this trend continues, about how many pairs of jeans would you expect to be defective in a shipment of 5000?

$$\frac{5}{200} \propto \frac{n}{5000}$$

$$\frac{200n}{200} = \frac{25000}{200}$$

$$n = 125 \text{ pairs}$$



### Theoretical Probability

When all possible outcomes are equally likely, the **theoretical probability** of an event is the ratio of the number of favorable outcomes to the number of possible outcomes.

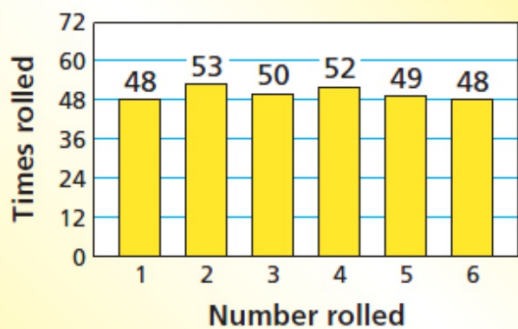
$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$



If you randomly choose one of the blocks shown, what is the theoretical probability of choosing...

- ...a vowel?  $\frac{3}{7}$
- ...a red letter?  $\frac{3}{7}$
- ...an E?  $\frac{2}{7}$

Rolling a Number Cube



The bar graph shows the results of rolling a number cube 300 times.

What is the **experimental probability** of rolling an odd number?

$$\frac{147}{300} = \frac{49}{100}$$

What is the **theoretical probability** of rolling an odd number?

$$\frac{150}{300} = \frac{1}{2}$$

The theoretical probability of winning this bobble-head when spinning a prize wheel is  $\frac{1}{6}$ . The wheel has 3 bobble-head sections. How many sections are on the wheel?



$$\begin{array}{l} \text{win.} \\ \text{poss.} \end{array} \frac{1 \cdot 3}{6 \cdot 3} = \frac{3}{n}$$
$$18 = n$$

Sections

# Homework

Green 5

**Due** Monday

