Warm Up

1) When flipping a fair coin, what is the probability of getting heads?

50% ½ 0.5

2) On the second flip what is the probability of getting heads?

50%

3) Jill flips a coin 5 times. All five times she gets heads. What is the probability of flipping heads on the 6th? 50%

These questions address one of the basic principles that we will repeatedly see in our probability units:

Whether an event, choice or outcome is
Independent - no impact / change from one event to the next
Dependent - there is change from one to the next

Another differentiation in data is...

Theoretical Data:

what we think or what should happen

Future predictions

Empirical Data:

what actually does happen

Past data collected

Most people focus on empirical information, thinking that what does happen is more important than what might happen.

But, if you study and plan on what might happen then you are better prepared for and can better predict what will happen.

Coin Toss Worksheet

Coin Worksheet

1. If you toss a coin 10 times, how many times should it come up heads? 5
2. If you toss a coin 20 times, how many times should it come up heads? 10
3. If you toss a coin 30 times, how many times should it come up heads? 15
4. If you toss a coin 40 times, how many times should it come up heads? 20
5. If you toss a coin 50 times, how many times should it come up heads? 25
6. Take a "fair coin" (no two headed coins or such) and toss it as fairly as you can 10 times. Record the numbe heads in the table below.
7. Toss this same coin 20 times and record the number of heads in the appropriate spot in the table below.
8. Toss this same coin 30 times and record the number of heads in the appropriate spot in the table below.
9. Toss this same coin 40 times and record the number of heads in the appropriate spot in the table below.
10. Toss this same coin 50 times and record the number of heads in the appropriate spot in the table below.

# of tosses	10	20	30	40	50
# of Heads	6	13			

# of tosses	10	20	30	40	50
# of heads Group 1	4	9	14	21	25
Group 2	4	7	11	16	24
Group 3	8	13	20	26	30
Group 4	6	9	14	21	29
Group 5	7	11	17	26	30
Group 6	5	14	20	25	32
Group 7	5	10	14	24	25
Group 8	7	14	18	24	30
Group 9	3	8	15	25	32
Group 10	8	14	19	24	30
Group 11	6	12	17	20	26
Group 12	6	11	17	26	28
Group 13	6	12	18	23	26
Group 14	7	12	20	25	32
Group 15	6	12	17	24	29
Group 16	4	8	13	16	21
Group 17					
Group 18					
Average # Of Heads	5.6	11	16.5	22.6	28.1

Large Number Theory:

As data increases, empirical data should get closer to theoretical

More data = Better predictions

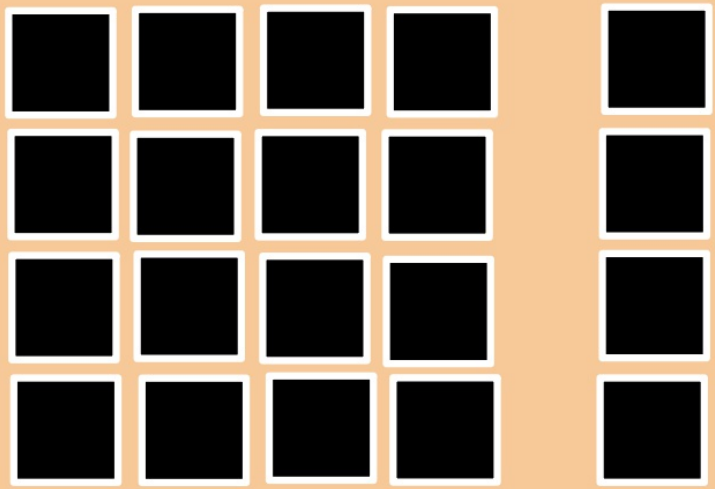
Two Main Types of Questions

Number of Possibilites -
How many outcomes are possible (whole number).
These are simply counting questions.

Probability -
What is the probability of...

$$\frac{\text{How many ways for success}}{\text{How many ways for total}}$$

Learning how to count...



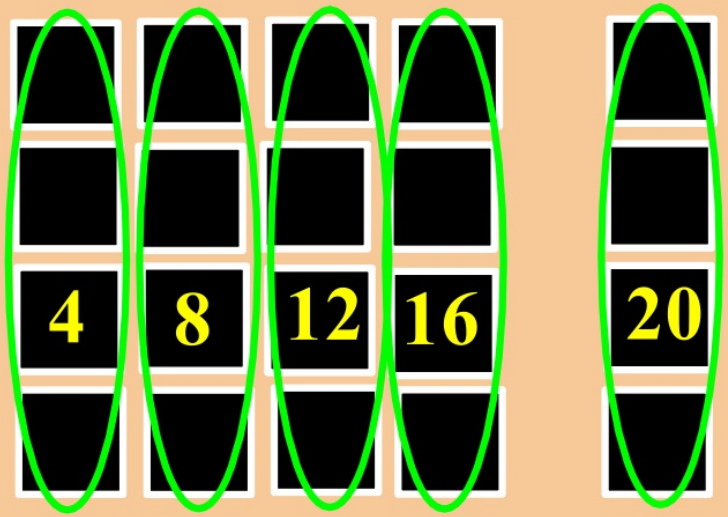
Not a trick question

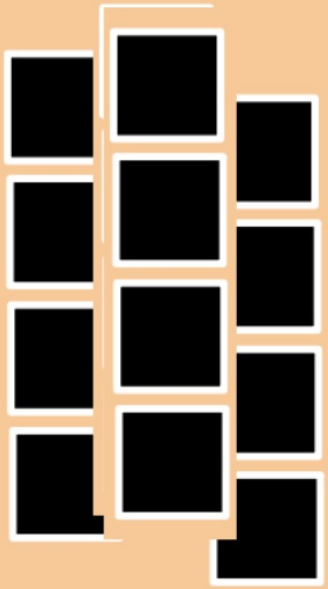
How many desks are there? 20

Learning how to count...

How many desks are there?

Learning how to count...

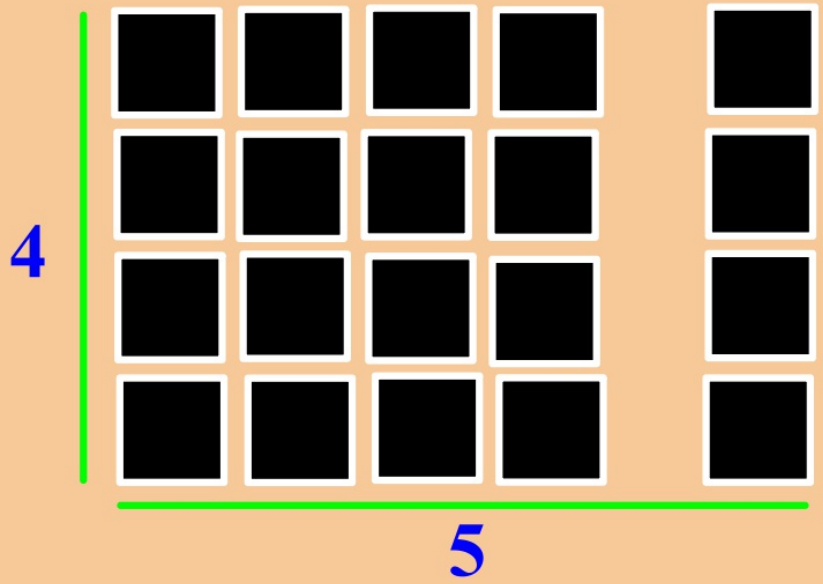




How many desks are there?

A

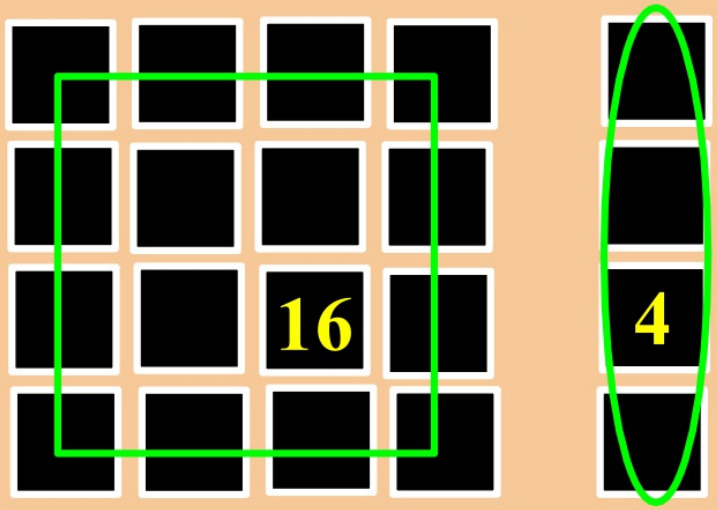
Learning how to count...



How many desks are there?

M

Learning how to count...



How many desks are there?

Fundamental Counting Principal

Basic way to determine the number of possible outcomes for multiple events or choices.

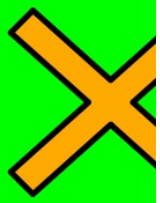
Muliply the number of options for each choice.

Ivette is a freshman at the University of Miami. She is planning her fall schedule for next year.

Copy Here: She has a choice of 5 math courses, 3 science and 6 humanities. If she selects one of each are, how many schedules are possible?

F.C.P.

$$\underset{\text{Math}}{5} \cdot \underset{\text{Sci}}{3} \cdot \underset{\text{Hum.}}{6} = 90 \text{ Schedules}$$



How many more 2004 style plates are possible ~~were possible~~ than 1912 style plates?

$26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10$

Letters Digits

17,576,000

$10 \cdot 10 \cdot 10 \cdot 10$

Digits

10,000

17,566,000