

1. Hamza rolls two dice. He rolls a sum of eight $13/40$ times in his experiment.

b) What is the theoretical probability of getting a sum of eight? $5/30 = 14\%$

$6 \cdot 6 = 36$ outcomes

a) Based on the theoretical probability, if he were to roll the dice 100 times, how many times should he roll a sum of eight?

$$\frac{5}{36} \approx \frac{x}{100}$$

$$\frac{500}{36} = \frac{36x}{36}$$

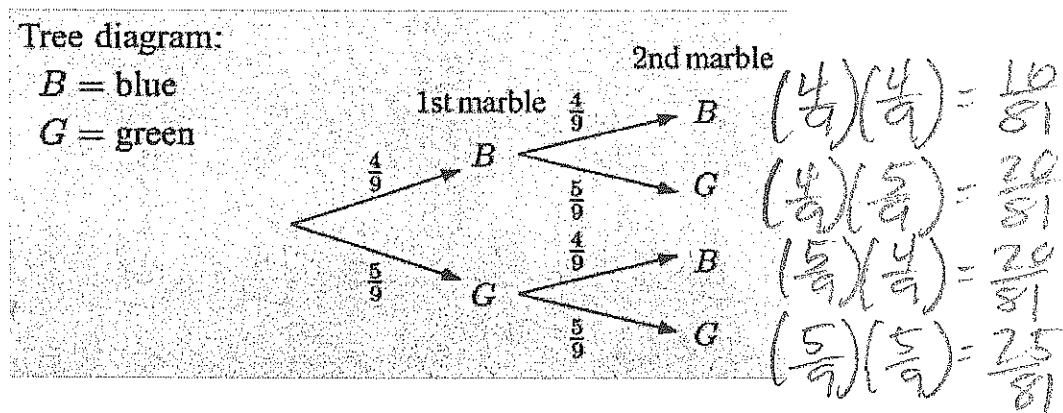
$x \approx 13.8$
times

2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10
6	7	8	9	10	11
7	8	9	10	11	12

c) Was the experimental probability similar to the theoretical? When do the two become similar?

A sum of 8 should occur 14% of the time, not 32.5%. It occurred more than what should. It would be closer with more trials in the experiment.

2. Ava is drawing two marbles from a bag. The tree diagram below models the scenario.



a) Calculate the total probabilities at the end of each path of the tree-diagram.

b) List all the possible outcomes that could occur when drawing the two marbles.

BB, GG, BG, GB

c) What is the probability of drawing blue and blue again? Show work at end of the path.

$$P(BB) = \frac{16}{81}$$

d) What is the probability that at least one marble is blue? Show all work.

$$\frac{16}{81} + \frac{20}{81} + \frac{20}{81} = \frac{56}{81}$$

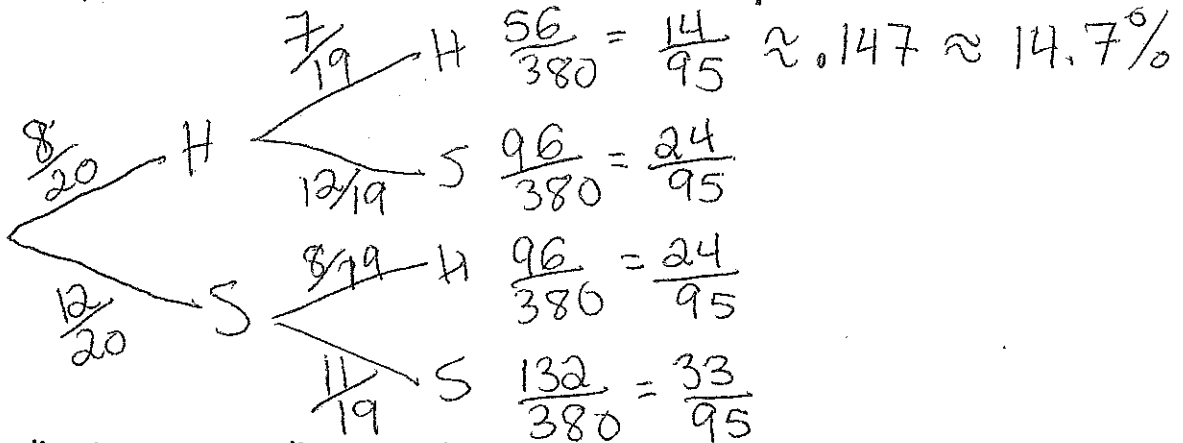
(BB, BG, GB)

e) Based on the tree diagram, does the event of drawing the first marble affect the drawing of the second marble? Why or why not? No. The probabilities of the 1st and 2nd marble picked from the bag are the same. This means the 1st marble was put back before choosing the 2nd marble. Independent events!

3. Abby has a box of 12 Starbursts and 8 Hershey Kisses to share with the class. As she goes around the room students close their eyes and select one candy, and then they eat it!

$P(S) = 12/20$ $P(2^{nd} S) = 11/19$ $P(H) = 8/20$ $P(2^{nd} H) = 7/19$

a) Model the probability of the first 2 student's choices using a tree diagram. Include the probabilities on the tree branches and at the end of the "paths".



b) According to your tree diagram, what is the probability that the first person and second person choose a Hershey Kiss? **Work should be shown at the end of the path.**

$P(H \& H) = \frac{8}{20} \cdot \frac{7}{19} \approx .147 \approx 14.7\%$



4. Sylvia can't decide what to wear today. She is deciding between 3 shirts, 2 pairs of pants, and 2 pairs of shoes. How many outfits is she deciding between? **Show all work.**

$\frac{3}{\text{shirts}} \times \frac{2}{\text{pants}} \times \frac{2}{\text{shoes}} = 12 \text{ outfits}$

5. Six friends are going to the Dance performance at the Lake Harriet Pavilion. Three door prizes of \$10, \$25, and \$50 will be given at the end of the show. How many ways could the door prizes be given out to these ~~four~~ ^{six} friends? **Show all work.** *3 friends don't win a prize in six*

$\frac{6}{\$10} \times \frac{5}{\$25} \times \frac{4}{\$50} = 120 \text{ arrangements for 3 different prizes.}$

6. Ms. Paulson is making some vegetable stew and has 5 different vegetables in her refrigerator: spinach, carrots, bell peppers, kale, and peas. How many ways could she select 2 different vegetables for the stew? **List the possible combinations of the two vegetables.**

- SC CB BK KP
- SB CK BP
- SK CP
- SP

} 10 stews with 2 types of vegetables.

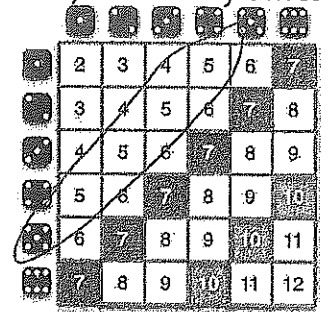
1. Luis rolls two dice. He rolls a sum of five 9/40 times in his experiment.

$$\frac{4}{36} = \frac{1}{9}$$

b) What is the theoretical probability of getting a sum of five?

a) Based on the theoretical probability, if he were to roll the dice 100 times, how many times should he roll a sum of five?

$$\frac{1}{9} = \frac{x}{100} \quad 9x = 100 \quad x \approx 11 \text{ times}$$



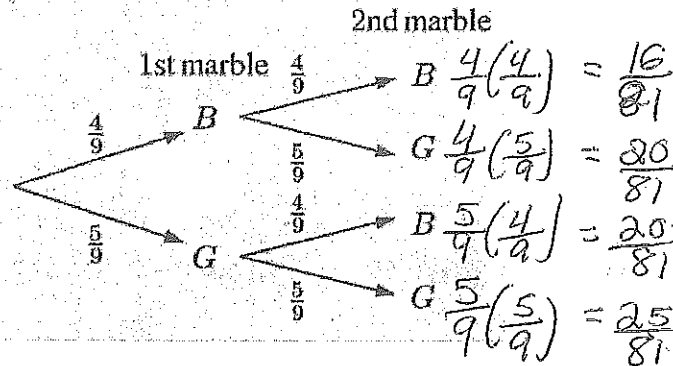
c) Was the experimental probability similar to the theoretical? When do the two become similar?

$\frac{9}{40} \approx 22.5\%$ $\frac{4}{36} \approx 11\%$ Experiment was about double than what we'd expect. If Luis rolled 100 total times, the 2% would get closer.

2. Alejandro is drawing two marbles from a bag. The tree diagram below models the scenario.

Tree diagram:

B = blue
G = green



a) Calculate the total probabilities at the end of each path of the tree diagram.

b) List all the possible outcomes that could occur when drawing the two marbles.

BB, BG, GB, GG

b) What is the probability of drawing green and green again? Show work at end of the path.

$$P(GG) = \frac{5}{9} \cdot \frac{5}{9} = \frac{25}{81} \approx 31\%$$

c) What is the probability that at least one marble is green? Show all work.

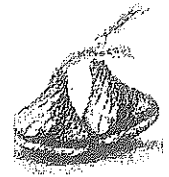
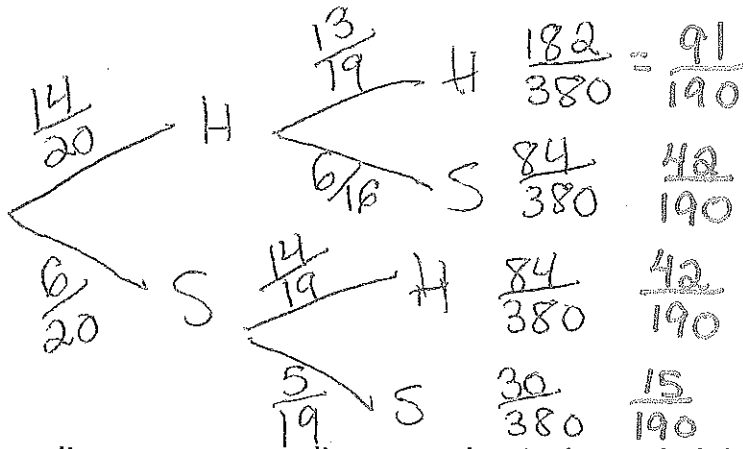
$$P(GG + GB + BG) = \frac{25}{81} + \frac{20}{81} + \frac{20}{81} = \frac{65}{81} \approx 80\%$$

d) Based on the tree diagram, does the event of drawing the first marble affect the drawing of the second marble? Why or why not?

No. The marble is put back in the bag. The probabilities of the 2nd marble shows the same ratios as the first marble. Independent events!

3. Micah has a box of 6 Starbursts and 14 Hershey kisses to share with the class. As she goes around the room students close their eyes and select one candy, and then they eat it!

$P(S) = \frac{6}{20}$ $P(2^{nd} S) = \frac{5}{19}$ $P(H) = \frac{14}{20}$ $P(2^{nd} H) = \frac{13}{19}$
 a) Model the probability of the first 2 student's choices using a tree diagram. Include the probabilities on the tree branches and at the end of the "paths".



b) According to your tree diagram, what is the probability that the first person and second person choose a Starburst? Work should be shown at the end path.

$$P(S \text{ or } S) = \frac{6}{20} \cdot \frac{5}{19} = \frac{30}{380} = \frac{6}{76} \approx 7.9\%$$

4. Kyron can't decide what to wear today. He is deciding between 4 shirts, 2 pairs of pants, and 2 pairs of shoes. How many outfits is he deciding between? Show all work.

$$\frac{4}{\text{Shirts}} \times \frac{2}{\text{Pants}} \times \frac{2}{\text{Shoes}} = 16 \text{ outfits}$$

5. Five friends are going to the Dance performance at the Lake Harriet Pavilion. Three door prizes of \$10, \$25, and \$50 will be given at the end of the show. How many ways could the door prizes be given out to these five friends? Show all work.

$$\frac{5}{\$10} \times \frac{4}{\$25} \times \frac{3}{\$50} = 60 \text{ arrangements.}$$

2 friends don't get a prize :-)

6. Mr. Oberembt is making a fruit pie and he has 5 different packages of fresh fruit in his refrigerator: blueberries, raspberries, peaches, strawberries, and cherries). How many ways could he select 2 of the fruits for the pie? List the possible combinations of the 2 fruits.

- BR
 - BP
 - BS
 - BC
 - RP
 - RS
 - RC
 - PS
 - PC
 - SC
- } 10 pies with 2 types of fruit.