Compound Events Key

Independent Event – Two or more events in which the outcome of one **does not affect** the outcome of the others.

Example – Pick a marble, **replace it**, then pick another marble.

Dependent Event – Two or more events in which the outcome of one **does affect** the outcome of the others.

Example – Pick a marble, **do not replace it**, then pick another marble.

Tell whether each event is independent or dependent.

a) Choosing a card from a hat and then choosing a second card without replacing the first one. D

b) Selecting a name from the Chicago telephone book and a name from the Houston telephone book. I

c) Tossing a coin twice I

d) Choosing a President, Vice President, and Secretary from three members of student council D

e) Tossing a coin and rolling a die I

Let's do some examples.

1. Neal has a bag of the following coins: 6 quarters, 4 dimes, 3 nickels, and 7 pennies. (20) He takes out a coin and does not replace it. Then he takes out another coin from the bag. What is the probability that the first coin is a quarter and the second coin is a dime?

$$P(Q, D) = \frac{6}{20} \cdot \frac{4}{19} = \frac{24}{380}$$

2. Marc has a bag of 3 red marbles and 2 blue marbles. He draws a red marble from the bag and does not return it. Then he draws a second marble. What is the probability that the second marble will be red?

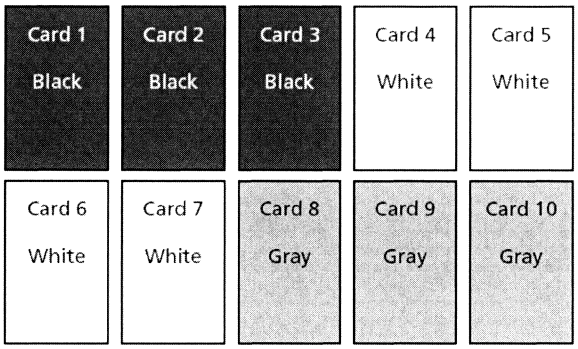
~~3R~~ + 2B

$$2R + 2B = \frac{2}{4} = \boxed{\frac{1}{2}}$$

3. When tossing coins, what are the following probabilities?
   a. P(H,H) $\frac{1}{2} \cdot \frac{1}{2} = \left(\frac{1}{4}\right)$
   b. P(T,H)

$$\frac{1}{2} \cdot \frac{1}{2} = \left(\frac{1}{4}\right)$$

4. Michael conducts a probability experiment in his math class. He uses the ten cards shown below.



Michael randomly picks one of the ten cards from a container, looks at the color and replaces the card. What is the probability that he will pick two gray cards in a row?

$P(G,G) \quad \frac{3}{10} \cdot \frac{3}{10} = \frac{9}{100}$

5. Hope has a bag containing 15 marbles. The table below shows the number of marbles of each color found in the bag.

Hope's Bag of Marbles

Marble Color	Number of Marbles
White	3
Red	8
Blue	3
Black	1

15 ✓

a. Hope randomly picks a marble. What is the Probability that it will be red?

$\frac{8}{15}$

b. Leah conducts her own experiment using the same bag of 15 marbles. She picks out one marble, does not replace it, picks out a second marble, does not replace it, and finally picks out a third marble. What is the probability that all the marbles will be blue?

$\frac{3}{15} \cdot \frac{2}{14} \cdot \frac{1}{13} = \frac{6}{2730} = \frac{1}{455}$

6. Samantha's bureau drawer has the following pair of socks: 4 white, 4 yellow, 2 pink, and 1 navy. She takes a white pair of socks from the drawer and does not replace it. The next day, Samantha takes another pair of socks from the drawer. What is the probability that the pair of socks is white?

11 total

~~4W~~ 4Y 2P 1N

10 total now

3W 4Y 2P 1N

$\frac{3}{10}$

7. Alexa has 2 green, 2 yellow, 2 coral, and 2 aqua beads in a box. What is the probability that she will choose a green bead and then a yellow bead if replacement occurs?

total 8

$P(G,Y) = \frac{2}{8} \cdot \frac{2}{8} = \frac{4}{64} = \frac{1}{16}$