PAP Geometry
Independent/Dependent Probability

Name: Key

Compound Probability - an event that consists of two or more events

Independent Probability - one event has no impact on another event

Dependent Probability - one event DOES have an impact on the other event(s)

Probabilities with replacement and without replacement.

Experiment 1: Suppose you have 2 bags with the exact same sets of marbles inside. Let's say there are 4 red, 5 blue and 9 yellow marbles in each bag. From the first bag, you reach in and make a selection. You record the color and then drop the marble back into the bag.

Experiment 2: You then repeat the experiment a second time. From the second bag you do exactly the same thing EXCEPT, after you select the first marble and record it's color, you do NOT put the marble back into the bag, You then select a second marble, just like the other experiment.

The first experiment involves a process called with replacement. You put the object back into the bag so that the number of marbles to choose from is the same for both draws.

The second experiment involves a process called without replacement. You do not put the object back in the bag so that the number of marbles is one less than for the first draw.

Examples:

1. A jar contains 6 red balls, 3 green balls, 5 white balls, and 7 yellow balls. Two balls are chosen from a jar, **with replacement**. What is the probability that both balls chosen are green?

$$\frac{3}{21} \cdot \frac{3}{21} = \boxed{\frac{1}{49}}$$

2. A jar contains 6 red balls, 3 green balls, 5 white balls, and 7 yellow balls. Two balls are chosen from a jar, **without replacement.** What is the probability that both balls chosen are green?

$$\frac{3}{21} \cdot \frac{2}{20} = \boxed{\frac{1}{70}}$$

3. Two cards are chosen at random from a deck of 52 cards without replacement. What is the portability of choosing two kings?

$\frac{4}{52} \cdot \frac{3}{51} = \boxed{\frac{1}{221}}$

4. A bag of candy contains 4 lemon flavored sour balls, and 5 lime flavored sour balls. If Tim reaches in, takes one out and eats it, and then 20 minutes later selects another and eats that one as well, what is the probability that they were both lemon flavored candies?

$\frac{4}{9} \cdot \frac{3}{8} = \boxed{\frac{1}{6}}$

5. Mary has 4 dimes, 3 quarters and 7 nickels in her purse. She reaches in and pulls out a coin, only to have it slip from her fingers and fall back into the purse. She then picks out another coin. What is the probability that she picked a nickel on both tries?

$\frac{7}{14} \cdot \frac{7}{14} = \boxed{\frac{1}{4}}$

6. A man who goes to work long before sunrise every morning gets dressed in the dark. In his sock drawer he has 6 black and 8 blue socks. What is the probability that his first pick was a black sock, but his second pick was a blue sock?

$\frac{6}{14} \cdot \frac{8}{13} = \boxed{\frac{24}{91}}$

7. A box contains 5 purple marbles, 3 green marbles and 2 orange marbles. Two consecutive draws are made from the box without replacement of the first draw. Find the probability of each event.

   a. P(orange first, green second) $\boxed{\frac{1}{15}}$

   $\frac{2}{10} \cdot \frac{3}{9}$

   b. P(both marbles are purple) $\boxed{\frac{2}{9}}$

   $\frac{5}{10} \cdot \frac{4}{9}$

   c. P(the first marble is purple, and the second is ANY color EXCEPT purple)

   $\frac{5}{10} \cdot \frac{5}{9} = \boxed{\frac{5}{18}}$

14.3 Independent and Dependent
Pre-AP Geometry

Name Key
Period _____ Date _____

EVALUATE

Must show all work for full credit!! Leave answers as simplified fractions.

1. A jar holds 3 black marbles and 2 white marbles. Two marbles are taken out with replacement. What is the probability that the first marble removed will be black and the second removed will be white?

$$\frac{3}{5} \cdot \frac{2}{5} = \boxed{\frac{6}{25}}$$

2. A class contains 12 juniors and 13 seniors as described below:

	Juniors	Seniors
Male	7	4
Female	5	9

If three random students are chosen to represent the class in an assembly, what is the probability that all three chosen students will be female seniors?

$$\frac{9}{25} \cdot \frac{8}{24} \cdot \frac{7}{23} = \boxed{\frac{21}{575}}$$

3. How many 3-digit numbers are possible if the last digit (units) is a 3?

$$9 \cdot 10 \cdot 1 = \boxed{90}$$

4. Two cards are drawn from a standard deck, without replacement. What is the probability that both cards drawn will be face cards?

$$\frac{12}{52} \cdot \frac{11}{51} = \boxed{\frac{11}{221}}$$

5. Bag A contains 9 red marbles and 3 green marbles. Bag B contains 9 black marbles and 6 orange marbles. Find the probability of selecting one green marble from bag A and one black marble from bag B.

$$\frac{3}{12} \cdot \frac{9}{15} = \boxed{\frac{3}{20}}$$

6. There are 24 students in a math class. Each day, the teacher randomly chooses 1 student to show a homework problem solution on the board. What is the probability that the same student will be chosen 4 days in a row?

$$\frac{1}{24} \cdot \frac{1}{24} \cdot \frac{1}{24} \cdot \frac{1}{24} = \boxed{\frac{1}{331,776}}$$

7. A bag contains 8 red ribbons, 7 green ribbons, and 3 yellow ribbons. If you randomly remove 2 of the ribbons from the bag at the same time, what is the probability that the ribbons will both be yellow?

$$\frac{3}{18} \cdot \frac{2}{17} = \boxed{\frac{1}{51}}$$

8. A box contains discs with letters on them, as shown in the diagram. You randomly remove four of the discs, one at a time, and set them in a row on a table. What is the probability that the discs you remove will be, in order, A B C D?

$$\frac{6}{16} \cdot \frac{3}{15} \cdot \frac{3}{14} \cdot \frac{4}{13}$$

C	A	B	A
D	C	C	A
A	D	A	B
A	B	D	D

$$= \boxed{\frac{9}{1820}}$$