Name: _____ Date: _____

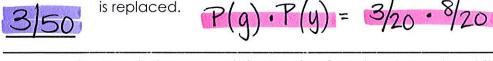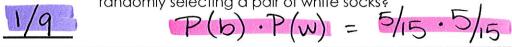## Independent and Dependent Events

1. A bag contains 5 red, 3 green, 4 blue, and 8 yellow marbles. Find the probability of randomly selecting a green marble, and then a yellow marble if the first marble is replaced.

$3/50$ $P(g) \cdot P(y) = 3/20 \cdot 8/20$

2. A sock drawer contains 5 pairs of each color socks: white, green and blue. What is the probability of randomly selecting a pair of blue socks, replacing it, and then randomly selecting a pair of white socks?
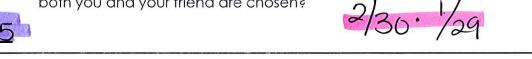
$1/9$ $P(b) \cdot P(w) = 5/15 \cdot 5/15$

3. In a standard deck of cards, what is the probability of picking a diamond and then another diamond without replacement?

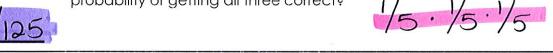$1/17$ $P(d) \cdot P(d|d)$ $13/52 \cdot 12/51$

4. Randy has 4 pennies, 2 nickles, and 3 dimes in his pocket. If he randomly chooses 2 coins, what is the probability that they are both dimes if he doesn't replace the first one?

$1/12$ $P(d) \cdot P(d|d)$ $3/9 \cdot 2/8$

5. Two students are chosen at random from a class of 30. What is the probability that both you and your friend are chosen?
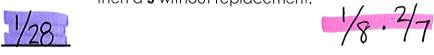
$1/435$ $2/30 \cdot 1/29$

6. A test includes several multiple choice questions, each with 5 choices. Suppose you don't know the answers for three of these questions, so you guess. What is the probability of getting all three correct?

$1/125$ $1/5 \cdot 1/5 \cdot 1/5$

7. Using the letters in the state ARKANSAS. Find the probability of picking an **S** and then an **A** without replacement.

$3/28$ $2/8 \cdot 3/7$

8. Using the letters in the state ARKANSAS. Find the probability of picking a **K** and then a **N** without replacement.

$1/56$ $1/8 \cdot 1/7$

9. Using the letters in the state ARKANSAS. Find the probability of picking a **R** and then a **S** without replacement.

$1/28$ $1/8 \cdot 2/7$

Determining if 2 Events are Independent

Check the following events and determine if they are independent. $P(A \cap B) = P(A) \bullet P(B)$

10. $P(A) = 0.45$ $P(B) = 0.30$ $P(A \cap B) = 0.75$

$$0.75 \overset{?}{=} 0.45 \cdot 0.3$$
$$0.75 \neq 0.135$$

Conclusion: **no! not independent**

11. $P(A) = 0.12$ $P(B) = 0.56$ $P(A \cap B) = 0.0672$

$$0.0672 \overset{?}{=} 0.12 \cdot 0.56$$
$$0.0672 = 0.0672$$
$$\checkmark$$

Conclusion: **yes! independent**

12. $P(A) = \dfrac{4}{5}$ $P(B) = \dfrac{3}{8}$ $P(A \cap B) = \dfrac{7}{40}$

$$\frac{7}{40} \overset{?}{=} \frac{4}{5} \cdot \frac{3}{8}$$
$$\frac{7}{40} \neq \frac{3}{10}$$

Conclusion: **no! not independent**

13. $P(A) = \dfrac{7}{9}$ $P(B) = \dfrac{3}{4}$ $P(A \cap B) = \dfrac{7}{12}$

$$\frac{7}{12} \overset{?}{=} \frac{7}{9} \cdot \frac{3}{4}$$
$$\frac{7}{12} = \frac{7}{12} \checkmark$$

Conclusion: **yes! independent**