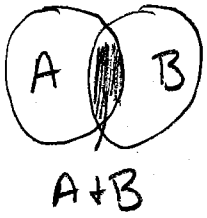
Day 3 - Probability of Compound Events Name: Key

Independent Events - One Event doesn't effect the other

Probability of Two Independent Events

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

Probability of both events | Probability of first event | Probability of second event



A+B

$A \cap B$

A intersection B

Examples
Rainy days
Rolling dice

EX1: Suppose there is a 40% chance of a snow day on Monday and a 80% chance on Tuesday. What is the probability that we will get a 4 day weekend!?

$P(A+B) = (.4)(.8) = 32\%$

EX2: What is the probability that in two rolls of a dice that you will roll a 5 then an even number?

$P(5+E) = \left(\frac{1}{6}\right)\left(\frac{1}{2}\right) = \frac{1}{12}$

EX3: Sally is throwing 3 coins into a fountain. What is the probability that all three end heads up?

$P(3 \text{ heads}) = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{1}{8}$

Dependent Events- One event depends on the other

$$P(A \text{ and } B) = P(A) \cdot P(B \text{ following } A)$$

Examples
Marbles 1 at a time,

EX4: A bag contains 8 red marbles, 12 blue marbles, 9 yellow marbles, and 11 green marbles. Three marbles are randomly drawn from the bag and not replaced. Find each probability if the marbles are drawn in the order indicated. total → 40

a. $P(red, blue, green) = \frac{\text{red}}{\frac{8}{40}} \cdot \frac{\text{blue}}{\frac{12}{39}} \cdot \frac{\text{green}}{\frac{11}{38}} = \frac{22}{1235}$ or $\frac{{}_8P_1 \cdot {}_{12}P_1 \cdot {}_{11}P_1}{{}_{40}P_3}$

b. $P(blue, yellow, yellow) = \frac{b}{\frac{12}{40}} \cdot \frac{Y}{\frac{9}{39}} \cdot \frac{Y}{\frac{8}{38}} = \frac{18}{1235}$ or $\frac{{}_{12}P_1 \cdot {}_9P_2}{{}_{40}P_3}$

c. $P(red, yellow, not\ green) = \frac{r}{\frac{8}{40}} \cdot \frac{Y}{\frac{9}{39}} \cdot \frac{NG}{\frac{27}{38}} = \frac{81}{2470}$ or $\frac{{}_8P_1 \cdot {}_9P_1 \cdot {}_{27}P_1}{{}_{40}P_3}$

d. $P(green) = \frac{G}{\frac{11}{40}}$

e. $P(not\ green) = 1 - \frac{11}{40} = \frac{29}{40}$

*Complements add to 1

Kuta Software - Infinite Algebra 2 Name_____

Independent and Dependent Events

Date_____ Period____

Determine whether the scenario involves independent or dependent events.

1) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows a one.

I

2) A bag contains eight red marbles and four blue marbles. You randomly pick a marble and then pick a second marble without returning the marbles to the bag. The first marble is red and the second marble is blue.

D

3) A box of chocolates contains five milk chocolates, five dark chocolates, and five white chocolates. You randomly select and eat three chocolates. The first piece is milk chocolate, the second is dark chocolate, and the third is white chocolate.

D

4) A cooler contains ten bottles of sports drink: four lemon-lime flavored, three orange flavored, and three fruit-punch flavored. Three times, you randomly grab a bottle, return the bottle to the cooler, and then mix up the bottles. The first time, you get a lemon-lime drink. The second and third times, you get fruit-punch.

I

Find the probability.

5) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows an even number.

I

$P(\text{H} + \text{E}) = \left(\frac{1}{2}\right) \cdot \left(\frac{1}{2}\right) = \frac{1}{4}$

6) You roll a fair six-sided die twice. The first roll shows a five and the second roll shows a six.

I

$P(5 + 6) = \left(\frac{1}{6}\right)\left(\frac{1}{6}\right) = \frac{1}{36}$

7) There are eight shirts in your closet, four blue and four green. You randomly select one to wear on Monday and then a different one on Tuesday. You wear blue shirts both days.

D

$P(b + b)$ $\frac{4}{8} \cdot \frac{3}{7}$

$\frac{1}{2} \cdot \frac{3}{7} = \frac{3}{14}$

8) A basket contains five apples and seven peaches. You randomly select one piece of fruit and eat it. Then you randomly select another piece of fruit. The first piece of fruit is an apple and the second piece is a peach.

D

$P(A + P)$ $\frac{5}{12} \cdot \frac{7}{11} = \frac{35}{132}$

D

A bag contains 5 red, 3 brown, 6 yellow, and 2 blue marbles. Once a marble is selected, it is not replaced. Find each probability. → /16

1. P(brown, then yellow, then red) $= \left(\frac{3}{16}\right)\left(\frac{6}{15}\right)\left(\frac{5}{14}\right) = \frac{90}{3360} = \frac{3}{112}$

2. P(red, then red, then blue) $= \left(\frac{5}{16}\right)\left(\frac{4}{15}\right)\left(\frac{2}{14}\right) = \frac{1}{84}$

or $\frac{2}{15}$

3. P(yellow, then yellow, then *not* blue) $= \left(\frac{6}{16}\right)\left(\frac{5}{15}\right)\left(\frac{12}{14}\right) = \frac{3}{28}$

4. P(brown, then brown, then *not* yellow) $= \left(\frac{3}{16}\right)\left(\frac{2}{15}\right)\left(\frac{5}{14}\right) = \frac{1}{20}$

Y: $\frac{6}{14}$

A die is rolled and a card is drawn from a standard deck of 52 cards. Find each probability.

5. P(6 and king) $= \left(\frac{6}{1}\right)\left(\frac{K}{52}\right) = \frac{1}{78}$

6. P(odd number and black) $\left(\frac{1}{2}\right) \cdot \left(\frac{1}{2}\right) = \frac{1}{4}$

A < 3

2 × 4 = 8

7. P(less than 3 and heart) $\left(\frac{2}{6}\right) \cdot \left(\frac{1}{4}\right) = \frac{2}{24} = \frac{1}{12}$

8. P(greater than 1 and black ace) $\left(\frac{5}{6}\right)\left(\frac{2}{52}\right) = \frac{5}{156}$

22

A bag contains 2 green, 9 brown, 7 yellow, and 4 blue marbles. Once a marble is selected, it is not replaced. Find each probability.

1. *P*(brown, then yellow) $= \left(\frac{9}{22}\right)\cdot\left(\frac{7}{21}\right) = \frac{3}{22}$

2. *P*(green, then blue) $\left(\frac{2}{22}\right)\left(\frac{4}{21}\right) = \frac{4}{231}$

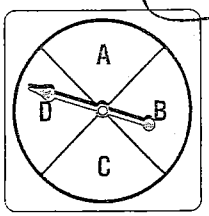
3. *P*(yellow, then yellow) $\left(\frac{7}{22}\right)\left(\frac{6}{21}\right)$ $\frac{1}{11}$

4. *P*(blue, then blue) $\left(\frac{4}{22}\right)\left(\frac{3}{21}\right)$ $\frac{2}{77}$ $\frac{2}{21}$

5. *P*(green, then *not* blue) $\frac{4}{21}$ $\left(\frac{2}{22}\right)\left(\frac{17}{21}\right) = \frac{17}{231}$

6. *P*(brown, then *not* green) $\left(\frac{9}{22}\right)\left(\frac{19}{21}\right)$ $\frac{57}{154}$

A die is rolled and a spinner like the one at the right is spun. Find each probability.



7. *P*(4 and A) $\left(\frac{1}{6}\right)\left(\frac{1}{4}\right) = \frac{1}{24}$

8. *P*(an even number and C) $= \left(\frac{1}{2}\right)\left(\frac{1}{4}\right) = \frac{1}{8}$

9. *P*(2 or 5 and B or D) $\left(\frac{2}{6}\right)\left(\frac{1}{2}\right) = \frac{1}{6}$

10. *P*(a number less than 5 and B, C, or D) $\left(\frac{4}{6}\right)\left(\frac{3}{4}\right) = \frac{1}{2}$

18

A bag contains 2 red, 6 blue, 7 yellow, and 3 orange marbles. Once a marble is selected, it is not replaced. Find each probability.

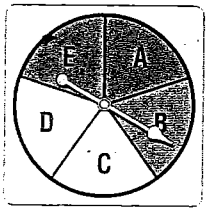
16. *P*(2 orange) $\frac{3}{18}\cdot\frac{2}{17} = \frac{6}{306} = \frac{1}{51}$

17. *P*(blue, then red) $\left(\frac{6}{18}\right)\left(\frac{2}{17}\right)$ $\frac{2}{51}$

18. *P*(2 yellows in a row then orange) $= \left(\frac{7}{18}\right)\left(\frac{6}{17}\right)\left(\frac{3}{16}\right) = \frac{7}{272}$

19. *P*(blue, then yellow, then red) $\left(\frac{6}{18}\right)\left(\frac{7}{17}\right)\left(\frac{2}{16}\right) = 7/408$

A die is rolled and a spinner like the one at the right is spun. Find each probability.



20. *P*(3 and D) $\left(\frac{1}{6}\right)\left(\frac{1}{5}\right) = \frac{1}{30}$

21. *P*(an odd number and a vowel) $\left(\frac{1}{2}\right)\left(\frac{2}{5}\right) = \frac{2}{10}$

22. *P*(a prime number and A) $\left(\frac{4}{6}\right)\left(\frac{1}{5}\right) = \frac{2}{15}$ 1, 2, 3, 5

23. *P*(2 and A, B, or C) $\left(\frac{1}{6}\right)\left(\frac{3}{5}\right) = \frac{3}{30} = \frac{1}{10}$