Warm Up:

You spin a spinner that has 12 equal-sized sections probability.

1. *P*(3 or 4)

$\frac{1}{12} + \frac{1}{12} = \frac{2}{12} = .17$

3. *P*(even or odd)

$\frac{6}{12} + \frac{6}{12} = \frac{12}{12} = 1$

5. *P*(odd or multiple of 5)

$\frac{6}{12} + \frac{2}{12} - \frac{1}{12} = \frac{7}{12} = .58$

7. *P*(even or less than 8)

$\frac{6}{12} + \frac{7}{12} - \frac{3}{12} = \frac{10}{12} = .83$

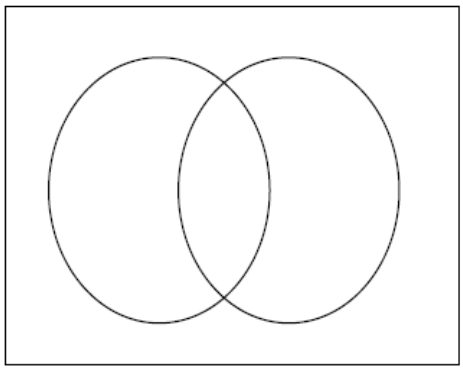
9. *P*(odd or greater than 4)

$\frac{6}{12} + \frac{8}{12} - \frac{4}{12} = \frac{10}{12} = .83$

A survey of couples in a city found the following probabilities:

a. The probability that the husband is employed is 0.85.
b. The probability that the wife is employed is 0.60.
c. The probability that both are employed is 0.55.

A couple is selected at random. Use a Venn diagram to find the probability that:



14. at least one of them is employed.

15. neither is employed.

Learning Goal: Today I will learn how to find the probability of the intersection of 2 events.

Success Criteria: I am able to calculate probability for independent and dependent events.

Conditional Probability

AND

AND: The Intersection of Events

Notation: $P(A \cap B)$

Multiply the probability of A by the probability of B

$$P(A \overset{\text{and}}{\cap} B) = P(A) \bullet P(B)$$

Independent Events

Independent events - one outcome has no effect on the other

$$P(A \cap B) = P(A) \bullet P(B)$$

Example: 7 marbles in a bag (4 green, 1 blue, 2 red)
Take one marble out and REPLACE it. Take another marble out.

$$P(green \overset{and}{\cap} blue) = \frac{4}{7} \cdot \frac{1}{7} = \frac{4}{49} = .08$$

$$P(green \overset{and}{\cap} green) = \frac{4}{7} \cdot \frac{4}{7} = \frac{16}{49} = .33$$

Dependent Events

Dependent events - one outcome affects the other

$$P(A \cap B) = P(A) \bullet P(B given A)$$

Example: 7 marbles in a bag (4 green, 1 blue, 2 red) Take one marble out and DO NOT REPLACE it. Take anothemarble out.

$$P(green \cap blue) = \frac{4}{7} \cdot \frac{1}{6} = \frac{4}{42} = .1$$

$$P(green \cap green) = \frac{4}{7} \cdot \frac{3}{6} = \frac{12}{42}$$

$$.29$$

Determine if the event is independent or dependent:

1. You select and eat a chocolate from a box. You select and eat a second one. dep

2. You roll a die and choose a letter tile. ind.

3. You roll a die 2 times. ind.

4. You choose one winning Powerball number and then choose the second. dep.

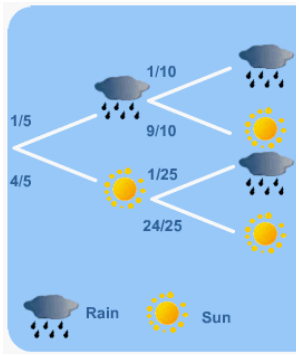
Example

Essay Contest One freshman, 2 sophomores, 4 juniors, and 5 seniors receive top scores in a school essay contest. To choose which 2 students will read their essays at the town fair, 2 names are chosen at random from a hat. What is the probability that a junior and then a senior are chosen?

$\frac{4}{12} \cdot \frac{5}{11} = .15$

Example

The weather forecast predicts the morning and afternoon weather patterns using the table below.



1. What is the probability that it will rain this morning and be sunny this afternoon?

$\frac{1}{5} \cdot \frac{9}{10} = \frac{9}{50} = .18$

2. What is the probability it will be sunny all day?

$\frac{4}{5} \cdot \frac{24}{25} = .77$

You have a white 6 sided die and a black 6 sided die.

1. What is P(sum 9)?
2. What is P(sum 11 or 6)?
3. What is P(sum 1)?

Closure: Today I learned how to find probability for independent and dependent events.