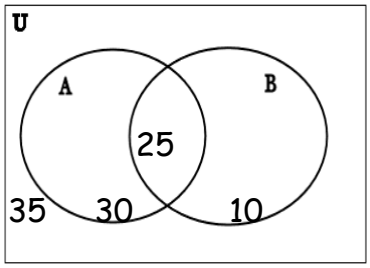
MATH 120 Section 8.2 Union, Intersection, Complement of Events & Odds

Probability and Venn Diagrams

1) Refer to the Venn diagram. Determine the following:



a) P(A)

b) P(B)

c) P(A′)

d) P(B′)

e) $P(A \cap B)$

f) $P(A \cup B)$

g) $P((A \cap B)')$

Odds

Example: 2) If the chance of rain is 40%, what is the chance of no rain?

Recall the probability of an event E: $P(E) = \frac{n(E)}{n(S)}$

The probability of the complement of an event: $P(E') = 1 - P(E)$

Example: 3) Consider the experiment of rolling a single die. Let the event be rolling a 6.

a) What is P(E)?

b) What is $P(E')$?

Odds: This is a comparison of happening: not happening for example, winning: losing

Odds for an Event = $P(E) : P(E')$ **Odds Against an Event** = $P(E') : P(E)$

Odds for an Event = $\frac{P(E)}{P(E')}$ **Odds Against an Event** = $\frac{P(E')}{P(E)}$

Examples

4) The probability that a candidate wins an election is 0.81.

a) What is the probability that he loses?

b) What are the odds that he wins?

c) What are the odds that he loses?

5) Compute the odds in favor of

a) Obtaining an even number in a single roll of a die.

b) Obtaining a sum of 7 in a single roll of two dice.

6) Given the following probabilities for an event E, find the odds for and against E.

a) $P(E) = \frac{6}{11}$

b) $P(E) = \frac{7}{12}$

c) P(E) = 37%

d) P(E) = 0.95