Complements and Unions of Events   (Section 13.2)

The objectives for this section include:

1. Understand the relationship between the probability of an event and the probability of its complement.
2. Calculate the probability of the union of two events.
3. Use complement and union formulas to compute the probability of an event.

Class Practice – What is the probability that the total showing on a pair of dice is less than 12? (Hint: see page 722 for the sample space)

The Probability of the Complement of an Event
If E is an event, then $P(E') = 1 - P(E)$

U or S

E

15   5

Ex. $P(E') = 1 - \dfrac{5}{20} = $ _____
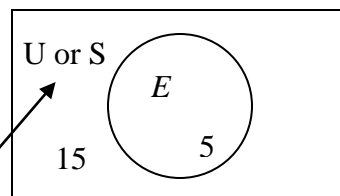
The universal set is also labeled the sample space
is everything in the rectangle including the sets represented with circles.

Class Practice –

a) If the probability that it will rain is 0.35, what is the probability that it will not rain?

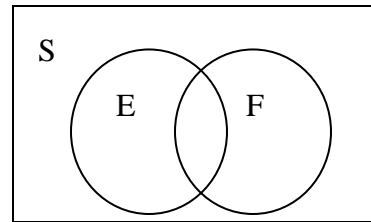b) If two dice are rolled, find the probability that neither die shows a multiple of 3.

Complete **Quiz Yourself** (**4**) on p. 739

Rule for Computing the Probability of a Union of Two Events.

If E and F are events, then $P(E \cup F) = P(E) + P(F) - P(E \cap F)$

Ex. Let $P(E) = 0.2$, $P(F) = 0.3$, $P(E \cap F) = 0.05$

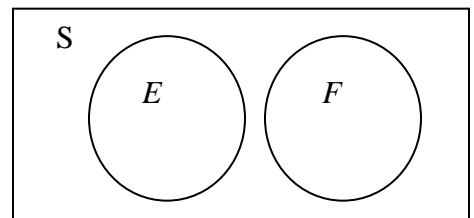Find $P(E \cup F)$

S

E   F

Class Practice –
a) If a single card is drawn from a standard deck, what is the probability that it is either a face card or a diamond?

b) If $P(C \cup D) = 0.8$, $P(C) = 0.5$, $P(D) = 0.47$, find $P(C \cap D)$.

Complete **Quiz Yourself 5** on p. 741

If E and F have no outcomes in common, they are called mutually exclusive events. In this case, because $E \cap F = \varnothing$, the formula above simplifies to $P(E \cup F) = P(E) + P(F)$

S

E   F

Class Practice – If a single card is drawn from a standard deck, what is the probability that you draw a heart or a diamond?

Class Practice – Assume W and E are events in S such that $P(W) = 0.7$, $P(E) = 0.5$, and $P(W \cap E) = 0.3$. Determine each of the following, showing your work for each.

S

W   E
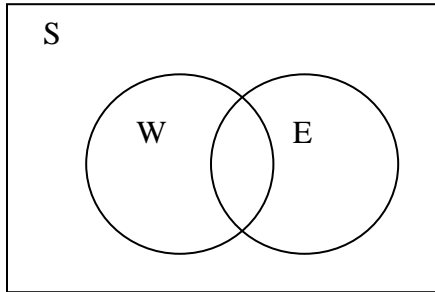
a. $P(W') =$ _____

b. $P(S) =$ _____

c. $P(W - E) =$ _____

d. $P(W' \cup E') =$ _____

Class Practice – Determine whether the statement is true of false for events C and D. Explain your answer.

$$P(C \cup D) - P(C) = P(D)$$

Review Problems

How many poker hands can be constructed made up of four aces?

How many ways can you arrange all the letters in "suppers"?

Assignment for Friday 3/12

Read pp. 737-743, Finish Guided Notes

Complete #1, 2, 5, 6, 9-15, 17, 19, 20, 21, 29, 30, 33, 34 37, 38 on pp. 743-745

& Section 13.2 Handout

Quiz Friday over Sections 13.1-13.2

Math 102

In the event of university-wide class cancellations, I will be posting the labs and links to video lectures on my course webpage located at:
http://www.mnstate.edu/harms/102/Spr10/Math102.htm

Assignments that are to be turned are to be sent as attachments to email to Professor Harms at harms@mnstate.edu

I will reply to email questions within 48 hours and if the campus is open I will keep my office hours M, W, F 8:30-10:20, 11:30-12:20, & T 11-12.

If you need to move from your residence, be sure to take your Math 102 textbook with you and if you have a computer take that as well. If you do not have a computer to check the course website call Professor Harms at 218-477-4016 to make arrangements to pick up and turn in expected work that while classes are not meeting.

This approach will help plan for the worst, but hope for the best so that the flood problems do not result in class cancellations.

Professor Harms