One card is selected from a standard deck of cards. Determine whether the following pairs of events are mutually exclusive and find P(A or B)

A= a six, and B= clubs

NOT M.E.

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

Section 12.7 Conditional Probability

The probability of event B occuring, given event A has happened is called **conditional probability** and is written P(B/A).

'the probability of B given A'

$\frac{2}{26}$

When you calculate the probability of B assuming that A has occurred

Example 1 page 784

A single card is selected from a deck of cards. Determine the probability it is a club, given that it is black.

5

$\frac{13}{26} = \frac{1}{2}$

Example 2 girls in a family

A family has two children. Assuming that boys and girls are equally likely, determine the probability that the family has

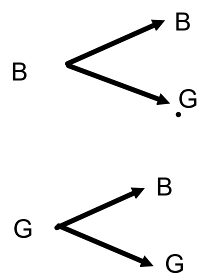
a) two girls. $\frac{1}{4}$ $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

b) two girls if you know that at least one of the children is a girl.

$\frac{1}{3}$ given

c) two girls given that the older child is a girl. $\frac{1}{2}$

1st child 2nd child



BB
BG ✓
GB ✓
GG ✓

Example 3

Two hundred patients who either had hip surgery or knee surgery were asked whether they were satisfied, dissatisfied, or neutral regarding the results of their surgery. The responses are given in the table below.

surgery	Satisfied	Dissatisfied	Total
Knee	70	25	95
Hip	90	15	105
Total	160	40	200

If a person is selected at random, determine the probability that the person:

a) was satisfied with the results of the surgery. $\frac{160}{200} = \frac{4}{5}$

b) was satisfied with the surgery, given that the person had knee surgery.

$\frac{70}{95} = \frac{14}{19}$

surgery	Satisfied	Dissatisfied	Total
Knee	70	25	95
Hip	90	15	105
Total	160	40	200

c) Was dissatisfied with the surgery, given that the person had hip surgery.

$$\frac{15}{105} = \frac{3}{21} = \frac{1}{7}$$

d) had hip surgery, given that the person was dissatisfied with the results of the surgery.

$$\frac{15}{40} = \frac{3}{8}$$

Hand out Worksheet 12.7

Page 789 #41-52

Age Distribution *For Exercises 53–58, use the following information concerning the age distribution of U.S. residents, based on 2005 population data. The data are rounded to the nearest million people.*

Age	Male	Female	Total
0–14	31	30	61
15–64	99	99	198
65 years or over	15	21	36
Total	145	150	295

Source: *The World Factbook*, January 2006.

If one of these individuals is selected at random, determine the probability that the person is

53. male. $145/295 = 29/59$

54. 15–64 years old. $\frac{198}{295}$

55. 15–64 years old, given that the person is female. $\rightarrow \frac{99}{150}$

56. 65 years or over, given that the person is female. $\rightarrow \frac{21}{150} = 7/50$

57. female, given that the person is 0–14 years old. $\rightarrow \frac{30}{61}$

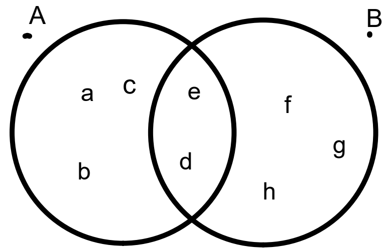
58. male, given that the person is 15–64 years old. $\frac{99}{198} = 1/2$

Formula for Conditional Probability

$$P\left(E_2 \uparrow E_1\right) = \frac{n\left(E_1 \; and \; E_2\right)}{n(E_1)}$$

the number of sample points common to both event. (the intersection of the 2 events.

the number of sample points in event 1



Find P(B/A) $\frac{2}{5}$

Handout Worksheet