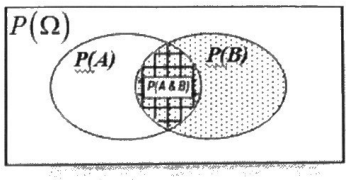
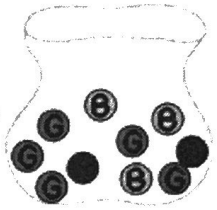
Conditional Probability- Additional Practice



P(A | B) asks that we find the probability of A given that we know B has or already occurred. Using a formula find the probability of A given B can be found using $\mathbf{P(A \mid B)} = \frac{\text{P(A and B)}}{\text{P(B)}}$

Directions- Leave answers in simplified fraction form and decimals rounded to the nearest hundredth.

1. Determine the following **conditional** probabilities.



Consider a bag with marbles, 3 blue marbles, 2 red marbles, and 5 green marbles. Three marbles are drawn in sequence and are taken **without replacement.** Total: 10

i. **P(**2nd draw: **blue** | 1st draw: **red)** =

$\frac{2}{10} \cdot \frac{3}{9} = \frac{1}{15} = .07$

ii. P **P(**2nd draw: **blue** | 1st draw: **blue)** =

$\frac{3}{10} \cdot \frac{2}{9} = \frac{1}{15} = .07$

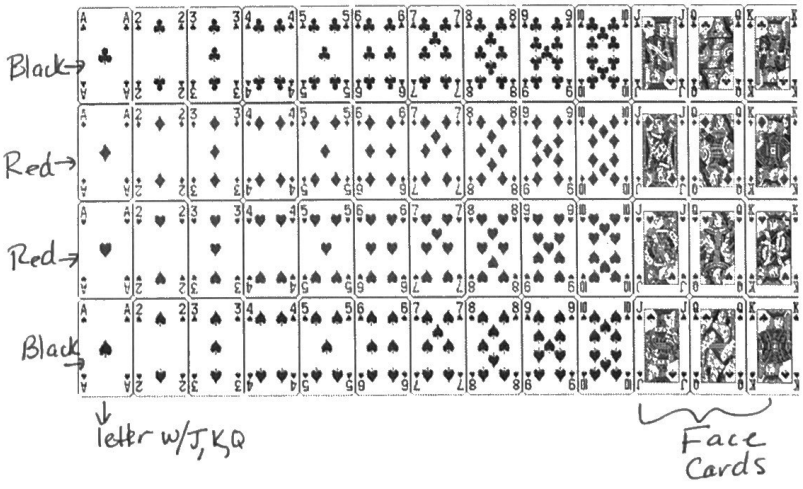
iii. **P(**3rd draw: **blue** | 1st draw: **red,** 2nd draw: **blue)** =

$\frac{2}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} = \frac{1}{60} = .02$

ii. P **P(**1st draw: **blue** | 1st draw: **red)** =

Impossible null/empty set $\{\}$

2. Determine the following **conditional** probabilities. Consider drawing 1 card from a standard deck of shuffled cards:



i. P(Queen | Face Card) = $\frac{4}{12} = .33$

ii. P(Ace | Lettered Card) = $\frac{4}{16} = .25$

iii. P(Heart with a Number | Red Card) = $\frac{9}{26} = .35$

3. Consider the following table with information about all of the students taking Statistics at Phoenix High School.

	Full-time	Part-Time	Total
(M)	28	15	43
(F)	12	16	28
Total	40	31	71

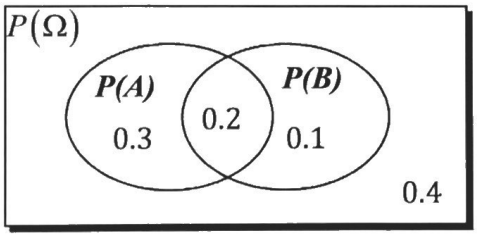
a. P(Full-time | Male) = $\frac{12}{28} = .43$

b. P(Male | Full-time) = $\frac{12}{40} = .3$

c. P(Female | Part-time) = $\frac{15}{31} = .48$

d. P(Full-time | Part-time) = $\frac{0}{31}$ not possible! $\{\}$ or $\emptyset$

4. Given the following VENN Diagram answer the following.



a. **P(A | B) =**

$\frac{P(A \cap B)}{P(B)} = \frac{.2}{.3} = .67$

c. **P(B | A) =**

$\frac{P(B \cap A)}{P(A)} = \frac{.2}{.5} = .4$

b. **P(A | B') =**

$\frac{P(A \cap B')}{P(B')} = \frac{.3}{.7} = .43$

d. **P(B | A') =**

$\frac{P(B \cap A')}{P(A')} = \frac{.1}{.5} = .2$

5. Given the **P(B) = 0.6** and **P(A | B) = 0.2** , determine the **P(A and B).**

$P(A|B) = \frac{P(A \cap B)}{P(B)} \Rightarrow \frac{.2}{1} = \frac{x}{.6}$ $\quad x = .2(.6) = .12$

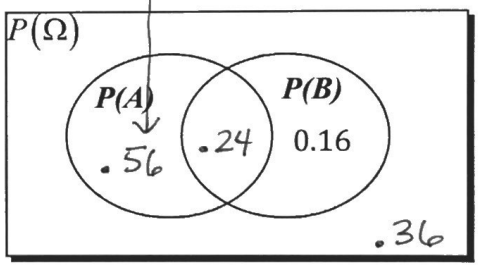
6. Given the VENN Diagram and **P(A) = 0.8** and **P(B | A) = 0.3**

a. Determine the **P(A and B)**

$P(B|A) = \frac{P(A \cap B)}{P(A)} \Rightarrow \frac{.3}{1} = \frac{x}{.8}$

$P(A \cap B) = .24$

$P(A) - P(A \cap B)$



b. Determine the **P(B)**

$.24 + .16 = .4$

c. Determine the **P(B' ∩ A)**

.56

d. Determine the **P((A ∪ B)')**

$1 - (.56 + .24 + .16)$

.36