Name: ____**ANSWER KEY**_____ Date: _____ Class: _____

Conditional Probability Practice

1. Use the information below which shows the results of a survey of 2000 gamers about their favorite home video game systems, organized by age group. If a survey participant is selected at random, determine the probability of each of the following.

Age Group	Play Station 2	X Box	GameCube	Dreamcast	Total
0-12	63	**84**	55	51	253
13-18	**105**	139	92	**113**	449
19-24	248	**217**	83	169	**717**
25+	191	166	**88**	136	581
Total	**607**	606	**318**	469	**2000**

a. P(X Box|13-18)

$\frac{139}{449}$

b. P(GameCube|19-24)

$\frac{83}{717}$

c. P(0-12|Dreamcast)

$\frac{51}{469}$

d. P(0-18|Play Station 2)

$\frac{63+105}{607}=\frac{168}{607}$

e. P(X Box|25+)

$\frac{166}{581}=\frac{2}{7}$

f. P(Playstation 2 or X Box|13-24)

$\frac{105+248+139+217}{449+717}=\frac{709}{1166}$

2. The chart below classifies each of the 2201 passengers on the Titanic by survival status and type of ticket. First Class tickets were the most expensive and Third Class tickets were the least expensive.

Survival	First Class	Second Class	Third Class	Crew	Total
Alive	**203**	118	178	**212**	711
Dead	122	**167**	528	673	**1490**
Total	325	285	**706**	**885**	2201

a. P(Alive)

$\frac{711}{2201}$

b. P(Second Class)

$\frac{285}{2201}$

c. P(First Class|Alive)

$\frac{203}{711}$

d. P(Dead|Crew)

$\frac{673}{885}$

e. P(First Class|Dead)

$\frac{122}{1490}=\frac{61}{745}$

f. P(Third Class or Crew|Dead)

$\frac{528+673}{1490}=\frac{1201}{1490}$

3. Below is a 2 way table describing the people in the Senate. Complete the chart and find the probabilities.

Gender	Democrats	Republicans	Total
Female	16	**4**	**20**
Male	**39**	41	80
Total	**55**	45	**100**

a. P(Female)

$$\frac{20}{100} = \frac{1}{5}$$

b. P(Male Republican)

$$\frac{41}{100}$$

c. P(Female or Democrat)

$$\frac{(20 + 55 - 16)}{100} = \frac{59}{100}$$

d. P(Female|Republican)

$$\frac{4}{45}$$

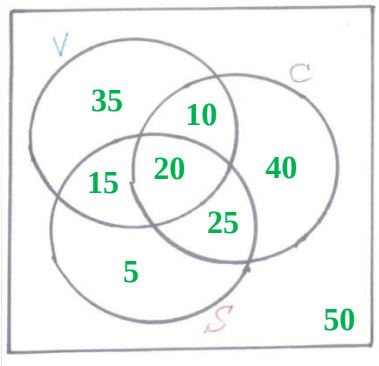
e. P(Democrat|Female)

$$\frac{16}{20} = \frac{4}{5}$$

f. P(Republican|Male)

$$\frac{41}{80}$$

4. A school survey of 200 students found that 80 students liked vanilla ice cream, 95 liked chocolate, and 65 liked strawberry. 25 students liked both strawberry and chocolate (but not vanilla), 15 liked vanilla and strawberry (but not chocolate), 10 liked vanilla and chocolate (but not strawberry) and 20 students liked all three flavors. If a student is chosen at random, find the following:



a) P(vanilla only)

$$\frac{35}{200} = \frac{7}{40}$$

b) P(none of the flavors)

$$\frac{50}{200} = \frac{1}{4}$$

~~c) P(vanilla and chocolate)~~

d) P(chocolate or strawberry)

$$\frac{15 + 5 + 20 + 25 + 10 + 40}{200} = \frac{115}{200} = \frac{23}{40}$$

e) P(strawberry | vanilla)

$$\frac{35}{80} = \frac{7}{16}$$

f) P(vanilla | not chocolate)

$$\frac{35 + 15}{35 + 15 + 5 + 50} = \frac{50}{105} = \frac{10}{21}$$

5. There is a jar with 5 blue marbles, 3 yellow marbles, and 10 red marbles. Find each of the following:
   a) P(blue, yellow) $\left(\frac{5}{18}\right)\left(\frac{3}{17}\right) = \frac{5}{102}$
   b) P(yellow, yellow) $\left(\frac{3}{18}\right)\left(\frac{2}{17}\right) = \frac{1}{51}$
   c) P(blue or yellow) $\frac{5+3}{18} = \frac{8}{18} = \frac{4}{9}$
   d) P(blue given yellow) $\frac{\left(\frac{3}{18}\right)\left(\frac{5}{17}\right)}{\frac{3}{18}} = \frac{5}{17}$
   e) P(red given red) $\frac{\left(\frac{10}{18}\right)\left(\frac{9}{17}\right)}{\frac{10}{18}} = \frac{9}{17}$

6. If a 6 is drawn from a deck of cards, what is the probability that the next card will be a Queen?

   ***always assume no replacement** $\frac{4}{51}$

7. What is the probability of drawing a single card from a deck of cards that is a diamond, given that it is a 9?

$$\frac{\#\ diamond\ 9s}{\#\ 9s} = \frac{1}{4}$$

8. In Colorado, assume the probability of owning skis is 56% and the probability of owning a snowboard is 34%. Also assume that the probability of owning both skis and a skateboard is 30%. Determine the following for a person selected at random in Colorado:
   a. What is the probability of a person owning skis or a skateboard?

$$.56 + .34 - .30 = .60 \rightarrow \frac{6}{10} = \frac{3}{5}$$

   b. What is the probability of a person owning a snowboard given that they own skis?

$$\frac{.30}{.56} = \frac{15}{28}$$

   c. If a person owns a snowboard, what is the probability that they also own skis?

$$\frac{.30}{.34} = \frac{15}{17}$$

9. You are dealt two cards from a deck of cards. What is the probability that the second card is a Jack if the first card was a Jack? $\frac{\left(\frac{4}{52}\right)\left(\frac{3}{51}\right)}{\frac{4}{52}} = \frac{3}{51} = \frac{1}{17}$

10. You are dealt two cards from a deck of cards. What is the probability that the second card is a Queen given that the first card was not a Queen? $\frac{\left(\frac{48}{52}\right)\left(\frac{4}{51}\right)}{\frac{48}{52}} = \frac{4}{51}$

11. If you draw two cards at random from a well-shuffled deck of cards, find the probability that the second card is a 7, given that the first card is a 3. $\frac{\left(\frac{4}{52}\right)\left(\frac{4}{51}\right)}{\frac{4}{52}} = \frac{4}{51}$