

Conditional Probability - The probability that an event (B), will occur given that another event has already occurred (A). ( Dependent Events)

$$P(B|A)$$

Contingency Table - frequency table that contains data from two different categories..

Education and Salary of Employees

	Under \$20,000	\$20,000 to \$30,000	Over \$30,000	
Less than high school	69	36	2	107
High school	112	98	14	224
Some college	102	193	143	438
College degree	13	178	245	436
	296	505	404	1205

1.  $P(\text{has less than high school education}) = \frac{107}{1205} = 8.9\%$

2.  $P(\text{earns over \$30,000 and has less than high school education}) = \frac{2}{1205} = 0.2\%$

3.  $P(\text{earns over \$30,000} \mid \text{has only high school education}) = \frac{14}{224} = 6.25\%$

4.  $P(\text{has high school education or less} \mid \text{earns over \$30,000}) = \frac{16}{404} = 4\%$

Use the table below to find each probability. The table gives information about students at one school.

Favorite Leisure Activities

	Sports	Hiking	Reading	Phoning	Shopping	Other
Female	39	48	85	62	71	29
Male	67	58	76	54	68	39

Handwritten totals: 334 (Female), 362 (Male), 696 (Total).  
 Handwritten column totals: 106 (Sports), 106 (Hiking), 161 (Reading), 116 (Phoning), 139 (Shopping), 68 (Other).

- 5.  $P(\text{sports} | \text{female}) = \frac{39}{334} = 11.7\%$
- 6.  $P(\text{female} | \text{sports}) = \frac{39}{106} = 36.4\%$
- 7.  $P(\text{reading} | \text{male}) = \frac{76}{362} = 21\%$
- 8.  $P(\text{male} | \text{reading}) = \frac{76}{161} = 47.2\%$
- 9.  $P(\text{hiking} | \text{female}) = \frac{48}{334} = 14.4\%$
- 10.  $P(\text{hiking} | \text{male}) = \frac{58}{362} = 16\%$
- 11.  $P(\text{male} | \text{shopping}) = \frac{68}{139} = 48.9\%$
- 12.  $P(\text{female} | \text{shopping}) = \frac{71}{139} = 51.1\%$

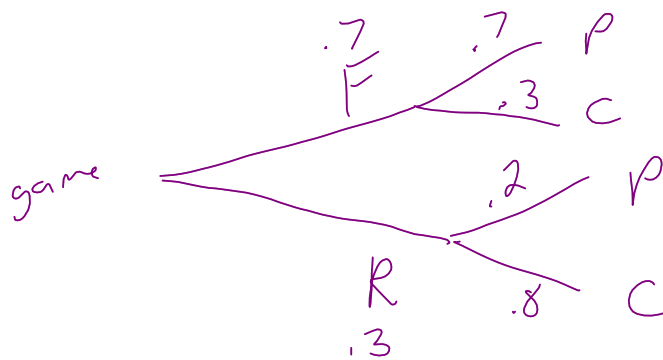
13. The senior class is 55% female, and 32% of the class are females who play a competitive sport. What is the probability that a student plays a competitive sport, given that the student is female?

$$P(\text{sport} \mid \text{female})$$

$$\frac{.32}{.55} = 58.2\%$$

14. A softball game has an 80% chance of being cancelled if it rains and a 30% chance of being cancelled if there is fog when there is no rain. There is a 70% chance of fog with no rain and a 30% chance of rain.

- Make a tree diagram based on the information above.
- Find the probability that there will be fog and the game will be cancelled.  $.3(.7) = .21 = 21\%$
- Find the probability that there will be rain and the game will be played.  $.3(.2) = .06 = 6\%$
- Find the probability that the game will be cancelled.



$$.7(.3) + .3(.8)$$

$$.21 + .24 = .45$$

$$45\%$$

