

### Warm UP: 1/18/18 & Thursday on ACT

Randomly select a student who took the 2010 AP Statistics exam and record the student's score. Here is the probability model:

Score	1	2	3	4	5
Probability	0.233	0.183	0.235	0.224	0.125

- (a) Find the probability that the chosen student scored 3 or better.
- (b) Find the probability that the chosen student didn't get a 1.
- (c) Find the probability that the chosen student got at least a 2.

The weatherman might state that Dayton has a probability of rain of 40 percent. However, this fact is *conditional* on many things:

- ★ The probability of a cold front coming to Dayton
- ★ The probability of rain clouds forming
- ★ The probability of another front pushing the rain clouds away

We say that the **conditional probability** of rain occurring depends on all of the above events.

LT: Calculate & understand conditional probability

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)} = \frac{P(A \cap B)}{P(B)}$$

Here is some data gathered about men and women who own or do not own pets.

	Have Pets	No Pets	Total
Male	27	5	32
Female	31	5	36
Total	58	10	68

Ex 1) What is the probability that a randomly selected person is <sup>A</sup> male, given that they <sup>B</sup> own a pet?

$$P(\text{Male} | \text{Pet}) = \frac{P(\text{M and Pet})}{P(\text{Pet})} = \frac{27}{58}$$

"gives" →

Ex 2) What is the probability that a randomly selected person has a pet, given that they are male?

$$P(P | M) = \frac{27}{32}$$

← Males!

Ex 3) What is the probability that a randomly selected person is female, given that they have a pet?

$$\frac{31}{58}$$

Debbie counts the videos and DVDs she has and places them into categories.

	Videos	DVDs	TOTAL
Film	43	16	59
Comedy	12	5	17
Sport	21	3	24
TOTAL	76	24	100

$$\text{Ex 1) } P(\text{DVD}) = \frac{24}{100}$$

$$\text{Ex 2) } P(\text{comedy on video}) = \frac{12}{100}$$

$$\text{Ex 3) } P(\text{sport category} \mid \text{DVD})$$

$$\frac{3}{24}$$

$$\text{Ex 4) } P(\text{film category} \mid \text{DVD})$$

$$\frac{16}{24}$$

$$\text{Ex 5) } P(\text{DVD} \mid \text{comedy})$$

$$\frac{5}{17}$$

Jaime investigated hair and eye color (blue eyes or other). He found that 15 students had light-colored hair and 15 had dark-colored hair. 13 students had blue eyes. Also, 8 had light-colored hair and blue eyes. Create a two-way table and answer the questions...

	light hair	dark hair	Total
Blue	8	5	13
Other	7	10	17
total	15	15	30

$$\text{Ex 1) } P(\text{blue}) = \frac{13}{30}$$

$$\text{Ex 2) } P(\text{blue} \cap \text{dark}) = \frac{5}{30}$$

$$\text{Ex 3) } P(\text{blue}|\text{dark}) = \frac{5}{15}$$

$$\text{Ex 4) } P(\text{not blue}|\text{dark}) = \frac{10}{15}$$

$$\text{Ex 5) } P(\text{light}|\text{blue})$$