Good morning!

1. "Here"

2. Finish up Two-Way Tables with Conditional Probability

of... from.. if....
out of.. Given that..

Conditional Frequencies

A **conditional frequency** is restricted to a particular group (or subgroup). Conditional frequencies are typically identified by the words "given that" or "if" or "what percent of (insert condition)". They do NOT come from the total data, but from a row or column total.

To calculate a conditional frequency, divide the joint frequency by the marginal frequency (does not matter if they are the frequencies or relative frequencies).

	Took Medicine	Did NOT Take Medicine	TOTAL
Headache	12	15	27
No Headache	48	25	73
TOTAL	60	40	100

★ Note: When a question asks you to find the probability, it is asking for the relative frequency. This means that your answer should be in the form of a decimal or fraction.

1. What is the probability that a participant did not get a headache if they took the medicine?

$\frac{48}{60}$ no headache AND took medicine / all medicine

$\frac{48}{60} = \frac{4}{5} = .8$

2. What is the probability that a participant took medicine given they did not have a headache?

$\frac{48}{73} = .658 = .66$

3. What is the probability that a participant took medicine given they did have a headache?

$\frac{12}{27} = .44$

4. If we know that a participant did not take medicine, what is the probability that they had a headache?

$\frac{15}{40} = .38$

5. How many participants took the medicine?

60

6. How many participants took the medicine and did not have a headache?

48

7. What percent of participants had a headache and took medicine?

$\frac{12}{100} = .12 \rightarrow 12\%$

Conditional Frequencies Practice

1) Students were surveyed about whether or not they have a pet and if they are allergic or not to animals. The results are below:

	Has a Pet	Does Not Have a Pet	
Allergic to Animals	32	192	224
Not Allergic to Animals	213	63	276
	245	255	500

a. What percent of those surveyed who are allergic to animals have a pet?

$\frac{32}{224} = .14 \rightarrow 14\%$

b. What is the probability that a person who is not allergic to animals has a pet?

$\frac{213}{276} = .77$

c. Given that someone has a pet, what is the probability that they are allergic to animals?

$\frac{32}{245} = .13$

d. What percent of those who have a pet are not allergic to animals?

$\frac{213}{245} = .87 \rightarrow 87\%$

2) The following contains the scores of the latest math project. Use the table to answer the following questions:

Project Scores

	Male	Female	
A	9	12	21
B	18	14	32
C	8	11	19
D	2	3	5
F	1	2	3
	38	42	80

a. What percentage of males earned a score of an "A"?

$\frac{9}{38} = .24 \rightarrow 24\%$

b. What percentage of those who earned an "A" were male?

$\frac{9}{21} = .43 \rightarrow 43\%$

c. What percentages of females earned a score of a "B"?

$\frac{14}{42} = .\overline{3} \rightarrow 33.3\%$

d. What percentage of those who earned an "F" were female?

$\frac{2}{3} = .67 \rightarrow 67\%$

e. Given that a student earned a "C", what is the probability that they are male?

$\frac{8}{19} \rightarrow .42$

Two Way Frequency Tables – Mixed Practice

The table below shows concession stand sales at last night's soccer game. Use this information to answer the questions on this page.

	Soda	Water	No Drink	
Hot Dog	50	62	46	158
Pizza	120	58	4	182
No Food	30	20	10	60
	200	140	60	400

1) How many people ordered a soda?

200

2) Given that a person ordered a hot dog, what is the probability that they also ordered a soda?

$\frac{50}{158} = .32$

3) What is the relative frequency of people who ordered pizza and water?

$\frac{58}{400} = .15$

4) What percent of people ordered no food?

$\frac{60}{400} = .15 \rightarrow 15\%$

5) Find the relative frequency of people who ordered no food and no drink.

$\frac{10}{400} = \frac{1}{40} = .03$

6) What is the probability that a person ordered soda and pizza?

$\frac{120}{400} = .30$

7) What is the probability that a person ordered no drink given that they ordered pizza?

$\frac{4}{182} = .02$

8) We know that Sarah ordered a soda. What is the probability that she ordered a hot dog?

$\frac{50}{200} = \frac{1}{4} = .25$

9) What is the probability that a person ordered no drink?

$\frac{60}{400} = \frac{6}{40} = \frac{3}{20} = .15$

10) How many people ordered only pizza?

4 (= Pizza and no drink)

$\frac{4}{400} = \frac{1}{100} = .01 \rightarrow 1\%$