## TOPIC: INTRO TO CONTINGENCY TABLES

### Finding Probabilities from Contingency Tables

◆ A **Contingency Table** shows frequencies across _____ categorical variables.

**EXAMPLE** The table below shows the results from a survey of 100 high school students. Use the table to find the probability that a randomly selected student…

**New** **Contingency Tables**

| | | Drives a Car | | |
|---|---|---|---|---|
| | | Yes | No | Total |
| Grade | Senior | 40 | 10 | 50 |
| | Junior | 20 | 30 | 50 |
| | Total | 60 | 40 | 100 |

**Marginal Prob:**

Prob. of an entire _____.

$$P(A) = \frac{total}{Grand\ Total}$$

**Joint Prob:**

Prob. of events $A$ _____ $B$ happening.

$$P(A \cap B) = \frac{freq.}{Grand\ Total}$$

**Conditional Prob:**

Prob. of event $B$, _____ event $A$ happened.

$$P(B|A) = \frac{cell\ freq.}{row\ or\ col.\ total}$$

($\boldsymbol{A}$) Drives a car.

($\boldsymbol{B}$) Is a senior and drives a car.

($\boldsymbol{C}$) Drives a car, given they are a senior.

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### PRACTICE

The table below shows the results from a drug trial for a new ADHD medication. Use the table to find the probability that…

| | | Group | | |
|---|---|---|---|---|
| | | Placebo | Non-Placebo | Total |
| Symptoms | Improved | 10 | 30 | 40 |
| | Not Improved | 40 | 20 | 60 |
| | Total | 50 | 50 | 100 |

$(\boldsymbol{A})$ …a person's symptoms improved, given that they received the placebo and identify the type of probability found.

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$(\boldsymbol{B})$ …a person's symptoms didn't improve and they received the non-placebo and identify the type of probability found.

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$(\boldsymbol{C})$ …a person's symptoms improved and identify the type of probability found.

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### EXAMPLE

Create a contingency table using the following information: 50 people were surveyed, 28% of people have blue eyes, 28% of people are blonde, 20% of people are both blonde and blue-eyed, no one has both black hair and hazel eyes, 40% of people have brown hair, 60% have brown eyes, 1 out of 7 blue-eyed people have black hair, and 50% of people with hazel eyes have blonde hair.

| | | Eye Color | | | |
|---|---|---|---|---|---|
| | | Brown | Hazel | Blue | Total |
| Hair Color | Black | | | | |
| | Brown | | | | |
| | Blonde | | | | |
| | Total | | | | 50 |

### EXAMPLE

The table below shows the results from a survey of guests at a wedding for the catering menu. Find the conditional distribution for vegetarians and the marginal distribution of diet types.

| | | Diet | | | |
|---|---|---|---|---|---|
| | | Vegetarian | Vegan | Neither | Total |
| Allergies | No | 9 | 6 | 60 | 75 |
| | Yes | 4 | 1 | 5 | 10 |
| | Total | 13 | 7 | 65 | 85 |