LAB SESSION 2 – DISTRIBUTIONS

Analytics Primer

PROBABILITY

Example

Number of Credit Cards Per Age Group

	Age Group				
Credit Cards	$20-29$	$30-39$	$40-49$	$50+$	**Total**
0	56	24	33	97	**210**
$1-2$	182	273	187	387	**1029**
$3-4$	147	358	413	212	**1130**
$5-6$	65	195	154	157	**571**
$7-8$	32	101	98	88	**319**
$9+$	10	67	123	11	**211**
Total	**492**	**1018**	**1008**	**952**	**3470**

Example

- Determine the probability of the following:
  1. Person is between the age of 20-29 and owns 3-4 credit cards

$$\frac{147}{492} \times \frac{492}{3470} = \frac{147}{3470} = 0.0424$$

  2. Person is between the age of 20-29 or owns 3-4 credit cards

$$\frac{492}{3470} + \frac{1130}{3470} - \frac{147}{3470} = \frac{1475}{3470} = 0.4251$$

Example

- Determine the probability of the following:
  3. Person owns 5-6 credit cards

$$\frac{571}{3470} = 0.1646$$

  4. Person owns at least one credit card

$$1 - \frac{210}{3470} = \frac{3260}{3470} = 0.9395$$

Example

- Determine the probability of the following:
  5. Person owns 1-2 credit cards given they are between the age of 30-39

$$\frac{273}{1018} = 0.2682 \qquad \text{OR} \qquad \frac{\left(\frac{273}{3470}\right)}{\left(\frac{1018}{3470}\right)} = 0.2682$$

  6. Person is above the age of 40 given they own 9 or more credit cards

$$\frac{123 + 11}{211} = 0.635$$

EDUCATION AND INCOME LEVEL TABLE

Example

Income (thousands)	No College	Some College	Associates Degree	Bachelors Degree	Masters Degree	Doctorate
<$30	40	25	24	30	2	1
$30 < $50	38	40	42	88	25	4
$50 < $70	10	11	15	50	41	9
> $70	2	3	11	21	13	10

Example

- What is the probability someone makes between $30 and $50 thousand **and** has a Master's degree?

$$\frac{25}{555} = 0.045$$

Example

- What is the probability someone makes between $30 and $50 thousand **or** has a Master's degree?

$$\frac{237}{555} + \frac{81}{555} - \frac{25}{555} = \frac{293}{555} = 0.53$$

Example

- What is the probability someone makes less than $30 thousand?

$$\frac{122}{555} = 0.22$$

Example

- What is the probability someone makes less than $30 thousand **given** that they did not have any college?

$$\frac{40}{90} = 0.44$$

OR

$$\frac{\left(\frac{40}{555}\right)}{\left(\frac{90}{555}\right)} = \left(\frac{40}{555}\right) \times \left(\frac{555}{90}\right) = 0.44$$