Name _____ Class _____ Date _____

Section 14-5 Notes

Probability Models

For Exercises 1–3, use the two-way frequency table below. It shows the number of pets owned by classmates and whether or not the pets live outside.

	Lives outside	Live inside	Totals
Dogs	17	7	24
Cats	8	8	16
Totals	25	15	40

1. What is the probability that a randomly chosen animal is a cat that lives outside?

   Set up a fraction using the number of cats that live outside as the numerator, and the total animal population as the denominator. Then simplify. $\frac{8}{40} = \boxed{\frac{1}{5}}$

"given" only look at the data in that row or column

2. What is P(is a dog | lives outside)? * only look at the "lives outside" column.

   Set up a fraction using the number of dogs that live outside as the numerator, and the total number of animals who live outside as the denominator. Then simplify. $\frac{17}{25} = \boxed{\frac{17}{25}}$

3. What is P(lives outside | is a dog)? $= \frac{17}{24}$ * only look at the "Dogs" row.

   ↓17 ↓24

For Exercises 4–7, use the two-way frequency table below. It shows the swimming preference of 100 men and women who visited a lakeside resort.

	Pool	Lake	Totals
Men	18	25	43
Women	22	35	57
Totals	40	60	100

4. What is the probability that a randomly chosen person is a man who prefers the pool? ↳18 $P(\text{man prefer pool}) = \frac{18}{100} = \boxed{\frac{9}{50}}$

5. What is the probability that a randomly chosen person is a woman given that the person prefers the pool? $P(\text{woman} \mid \underset{\downarrow 40}{\text{pool}}) = \frac{22}{40} = \boxed{\frac{11}{20}}$ * Only look at the "Pool" column.

6. What is the probability that a randomly chosen person prefers the lake, given that the person is a man? $P(\text{lake} \mid \underset{\downarrow 43}{\text{man}}) = \frac{25}{43}$ * Only look at the "Men" row.

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Name _____ Class _____ Date _____

Practice (continued)

Form K

Probability Models

For Exercises 7–9, use the two-way frequency table below. It shows where some students prefer to study.

	Library	Home	Cafe	Totals
Freshman	1	8	1	10
Sophomore	3	4	3	10
Totals	4	12	4	20

only "home" column

7. What is the probability that a randomly chosen student is a freshman given that the student prefers to study at home?

$P(F \mid \text{Home}) = \frac{8}{12} = \frac{2}{3}$

8. What is P(prefers the library | is a sophomore)? $= \frac{3}{10}$

only "Soph" row.

9. **Reasoning** Explain why the bottom row and the far-right column of the table have the same sum.

so you can know the total for each row/column to use in the probabilities.

The table below is a relative frequency distribution for people who are interested in building rowboats. Use the table for Exercises 10 and 11.

	Watched the video	Did not watched the video	Totals
Built a rowboat	0.5	0.1	0.6
Did not build a row boat	0.3	0.1	0.4
Totals	0.8	0.2	1

only use "watched" column.

10. What is the probability that a person who watched the video built a rowboat?

$P(\text{rowboat} \mid \text{watched video}) = \frac{0.5}{0.8} = \frac{5}{8}$ or 0.625

To start, set up a fraction with the relative frequency of people that watched the video as the denominator: $\frac{\quad}{0.8} = \frac{\quad}{\quad}$

only "didn't watch" column.

11. What is P(built a rowboat | didn't watch the video)?

$= \frac{0.1}{0.2} = \frac{1}{2}$ or .5

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