

Unit 8 Review: Statistics and Probability

Use the following table to answer questions 1-5.

A few classes are deciding on the name of their classroom pet. The students have been asked to vote on the top two choices: Fluffy or Spike. The results are summarized in the table below.

	Fluffy	Spike	Total
Female	20	10	30
Male	5	15	20
Total	25	25	50

1. Give the marginal distribution of name choice.

Fluffy $\frac{25}{50}$ 50% Spike $\frac{25}{50}$ $25 \div 50 \times 100$
50%

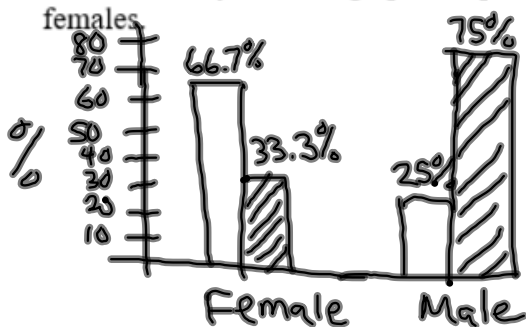
2. Give the conditional distribution of name choice for the females.

total female Fluffy $\frac{20}{30}$ 66.7% Spike $\frac{10}{30} = \frac{1}{3}$ 33.3%

3. Give the conditional distribution of name choice for the males.

total male Fluffy $\frac{5}{20}$ 25% Spike $\frac{15}{20}$ 75%

4. Draw a side-by-side bar graph comparing the conditional distributions of name choice for males and females.



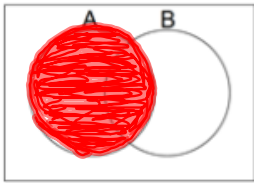
Fluffy
 Spike

Write a few sentences comparing the conditional distributions of name choice for males and females.

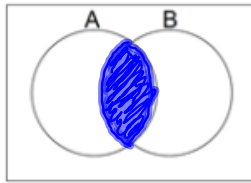
Males liked Spike
 Females liked Fluffy

Shade the indicated regions on the Venn Diagram.

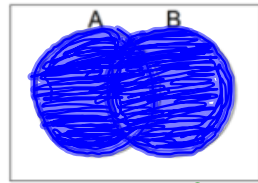
6. A circle A



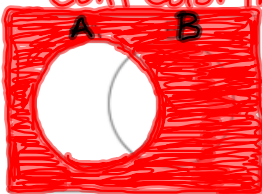
7. $A \cap B$



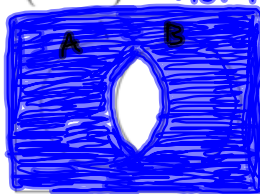
8. $A \cup B$ both circle A and circle B



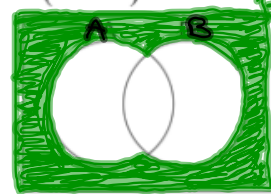
9. A^c don't color in any of circle A
not A



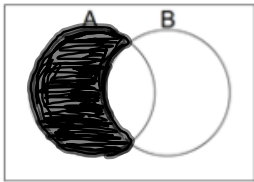
10. $(A \cap B)^c$ not intersection



11. $(A \cup B)^c$ not A not B

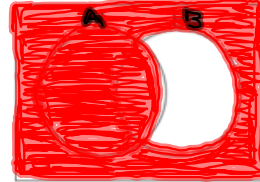


12. $A - B$



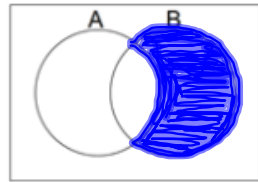
just A but not any B

13. $A \cap B^c$



all of circle A and not B

14. $B \cap A^c$



Intersection of B and not A

15. Use the Venn Diagram at the right to answer the following questions:

a. What is the sample space?

{ Sept, Nov, Oct, Dec, Jan, March, May, July, Aug, Feb, Apr, June }

b. List the outcomes in A .
circle A

{ Sept, Nov, Oct, Dec }

c. List the outcomes in B .
circle B

{ Jan, March, May, July, Aug, Oct, Dec }

d. List the outcomes in A^c .
Everything not in circle A

{ Jan, March, May, July, Aug, Feb, Apr, June }

e. List the outcomes in $A \cup B$. In circle A and circle B

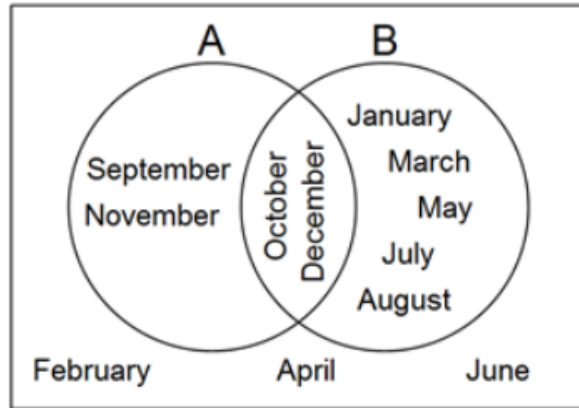
{ Sept, Nov, Oct, Dec, Jan, March, May, July Aug }

f. List the outcomes in $A \cap B$. intersection (middle)

{ Oct, Dec }

g. List the outcomes in $(A \cup B)^c$. not A not B

{ Feb, Apr, June }



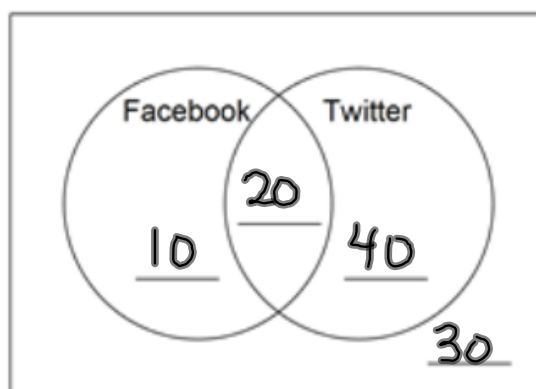
A = Months that end in "ber"

B = Months with 31 days

16. In a group of 100 students, 30 have Facebook accounts, 60 have Twitter accounts, and 20 have both Facebook and Twitter accounts.

a. Fill in the Venn Diagram.

$$\begin{aligned} \text{Total } 100 &= \underline{10} + \underline{20} + \underline{40} + \underline{30} \\ \text{Facebook } \underline{10} + \underline{20} &= 30 \\ \text{Twitter } \underline{20} + \underline{40} &= 60 \end{aligned}$$



b. What is the probability that a student chosen at random has a Facebook or Twitter account?

$$P(\text{Facebook} \cup \text{Twitter}) = \frac{10+20+40}{100} = \frac{70}{100} \boxed{70\%}$$

17. The table below shows the results of a survey that asked students whether they do chores and whether they receive an allowance. Fill in the marginal totals, then answer the questions. Write each probability in symbols, then find the probability. Write the answers as simplified fractions.

	Chores	No Chores	Total
Allowance	65	15	80
No Allowance	20	30	50
Total	85	45	130

a. What is the probability that a student from the sample receives an allowance?

$$P(\text{Allowance}) = \frac{80}{130} = \frac{8}{13}$$

b. What is the probability that a student from the sample has chores and does not receive an allowance?

$$P(\text{chores} \cap \text{No Allowance}) = \frac{20}{130} = \frac{2}{13}$$

c. What is the probability that a student from the sample has no chores or receives an allowance?

$$P(\text{no chores} \cup \text{allowance}) = \frac{45 + 80 - 15}{130} = \frac{110}{130} = \frac{11}{13}$$

d. What is the probability that a student who has chores receives an allowance?

$$P(\text{Allowance} | \text{chores}) = \frac{65}{85} = \frac{13}{17}$$

*65 ÷ 85
math enter
enter*

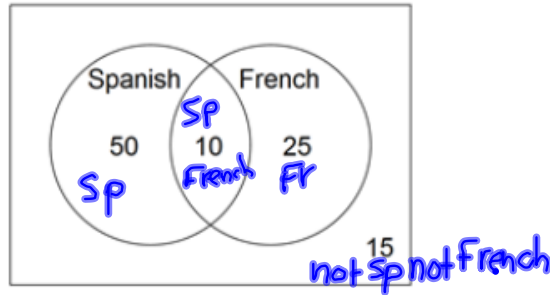
e. What is the probability that a student has no chores given that the student does not receive an allowance?

$$P(\text{no chores} | \text{no allowance})$$

$$\text{no Allowance} = \frac{30}{50} = \frac{3}{5}$$

8. The Venn Diagram below ~~shows~~ shows how many members of a foreign-language club speak Spanish and/or French. Express all probabilities as percentages.

Surveyed
Total: $50 + 10 + 25 + 15$
100



a. $P(\text{Spanish})$

$$\frac{60}{100} \quad \boxed{60\%}$$

b. $P(\text{French})$

$$\frac{35}{100} \quad 35\%$$

c. $P(\text{Spanish} \cap \text{French})$

$$\frac{10}{100} \quad 10\%$$

d. $P(\text{Spanish} \cup \text{French})$

$$\frac{50 + 10 + 25}{100} = \frac{85}{100} = 85\%$$

e. $P(\text{Spanish} | \text{French})$

$$\frac{\text{Sp AND Fr}}{\text{French}} = \frac{10}{35} = 28.6\%$$

f. $P(\text{French} | \text{Spanish})$

$$\frac{\text{French} \cap \text{Sp}}{\text{Spanish}} = \frac{10}{60} \quad \boxed{16.7\%}$$

g. $P(\text{not Spanish} | \text{not French})$

$$\frac{\text{not French} \cap \text{not Sp}}{\text{not French}}$$

$$\frac{15}{50 + 15} = \frac{15}{65}$$

$$15 \div 65 \times 100 \quad \boxed{23.1\%}$$

h. $P(\text{not French} | \text{Spanish})$

$$\frac{\text{not French}}{\text{Spanish}} = \frac{50}{60}$$

$$50 \div 60 \times 100 \quad \boxed{83.3\%}$$

i. $P(\text{French} | \text{not Spanish})$

$$\frac{\text{French}}{\text{not Spanish}} = \frac{25}{25 + 15} = \frac{25}{40}$$

$$\boxed{62.5\%}$$

Vocabulary

Directions: Next to each term, write the letter corresponding to the correct definition.

<u>J</u> 1. Sample Space	A. The set of all elements that are in <i>either A or B or both.</i> union
<u>A</u> 2. Union	B. The fraction or percent of a group that fall in a category. Relative frequency
<u>E</u> 3. Categorical Variable	C. The objects described by a set of data. They may be people, animals, or things. individuals
<u>F</u> 4. Event	D. Gives the relative frequencies of all the individuals <i>in the entire sample</i> who fall into each category. marginal distribution
<u>G</u> 5. Intersection	E. A characteristic of an individual that places the individual into one or more groups. categorical var.
<u>B</u> 6. Relative Frequency	F. <i>One outcome or a set of outcomes</i> of a chance process. event
<u>D</u> 7. Marginal Distribution	G. The set of all elements that are in <i>both A and B.</i> intersection
<u>H</u> 8. Complement A^c not	H. All of the elements that are <u>not</u> in a set. complement
<u>C</u> 9. Individuals	I. Gives the relative frequencies of all the individuals in <i>just one subgroup</i> who fall into each category. conditional dist.
<u>I</u> 10. Conditional Distribution	J. The set of <i>all possible outcomes</i> of a chance process. sample space