

Integrated H
Day 6: Venn Diagrams Homework

1. In a large high school, 43% of the students are girls and 45% of the students play sports. Half of the girls at the school play sports.



A) What percentage of the students who play sports are boys?

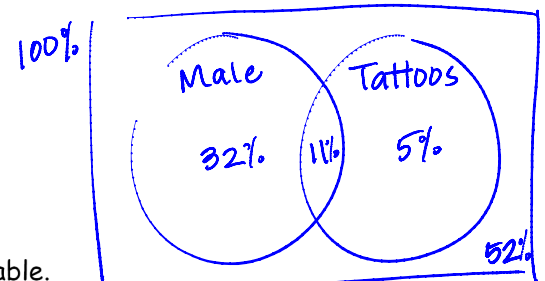
$$P(\text{Boy} | \text{Sports}) = \frac{P(\text{Boy} \cap \text{Sports})}{P(\text{Sports})} = \frac{23.5\%}{45\%} \approx 52.2\%$$

B) If a student is chosen at random, what is the probability that it is a boy who does not play sports?

$$\begin{aligned} P(\text{Boy} \cap \text{not Sports}) &= 1 - P(\text{Boy} \cap \text{Sports}) \\ &= 1 - .235 \\ &= .765 \text{ or } 76.5\% \end{aligned}$$

2. Having just been in the Southwest, Ms. Gagliano was curious about tattoos, so she polled her classes and here is what she discovered. 43% of her class is male, 16% of her class has tattoos and 11% are males with tattoos.

a) Make a Venn Diagram that displays this information!



b) Okay, using the same information, enter it into a two way table.

	Male	Not Male	TOTALS
Tattooed	11	5	16
Not tattooed	32	52	84
TOTALS	43	57	100

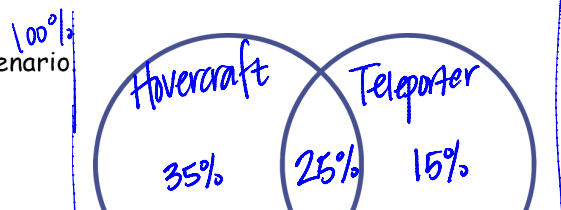
What is the probability that if Ms. Gagliano selected a male in one of her classes he would have a tattoo?

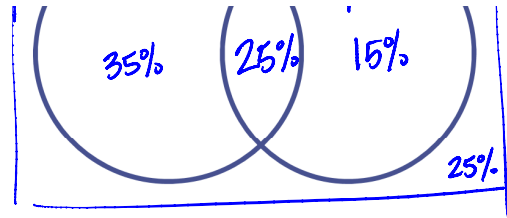
$$\frac{11}{43} \text{ or } .256 \text{ or } 25.6\%$$

$$P(\text{tattoo} | \text{male}) = \frac{P(\text{tattoo} \cap \text{male})}{P(\text{male})} = \frac{11}{43}$$

3. In a certain community, 60% of residents own a Hovercraft, 40% of residents own a Teleporter, and 25% of residents own both a Hovercraft and a Teleporter.

a. Fill in the Venn diagram to illustrate the scenario





b. Find the probability that a resident owns a Hovercraft but not a Teleporter. 35%

c. Find the probability that a resident owns neither a Hovercraft nor a Teleporter. 25%

Now Let's Practice Conditional Probabilities from a Two-Way Frequency Table©...
 Two psychologists surveyed 478 children in grades 4,5, and 6. They stratified by gender and asked the students about their primary goals. Below is the contingency table giving the counts of the students by primary goal and gender.

Gender	Goals			Total
	grades	popular	sports	
male	117	67	43	227
female	130	74	47	251
Total	247	141	90	478

a) Find the following probabilities to one decimal place. Show fractions as well.

MARGINAL PROBABILITIES

$$P(\text{male}) = \frac{227}{478} \approx 47.5\%$$

$$P(\text{female}) = \frac{251}{478} \approx 52.5\%$$

$$P(\text{grades}) = \frac{247}{478} \approx 51.7\%$$

$$P(\text{Popular}) = \frac{141}{478} \approx 29.5\%$$

$$P(\text{sports}) = \frac{90}{478} \approx 18.8\%$$

CONDITIONAL PROBABILITIES

$$P(\text{sports} | \text{female}) = \frac{47}{251} \approx 18.7\%$$

$$P(\text{female} | \text{popular}) = \frac{74}{141} \approx 52.5\%$$

$$P(\text{male} | \text{grades}) = \frac{117}{247} \approx 47.4\%$$

$$P(\text{male} | \text{sports}) = \frac{43}{90} \approx 47.8\%$$

$$P(\text{sports} | \text{male}) = \frac{43}{227} \approx 18.9\%$$

$$P(\text{popular} | \text{male}) = \frac{67}{227} \approx 29.5\%$$

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