

**1.1-1.2 and 1.4: Propositions and Truth Values, Sets and Venn Diagrams, Logical Fallacies**

Group Activity

Have the reader in your group read each question and as a group, discuss your answer.



1. Discuss each item and decide which are propositions. Circle or highlight them.

- a) Are you hungry?
- b) Janae was nominated for student council president.
- c) Four pounds less.
- d)  $7 + 8 = 33$
- e) I have two siblings.

2. A proposition is given, represented by the letter  $p$ . Write the wording for the negation and double negation. (Note: not  $p$  can also be represented in symbols by  $\sim p$ .)

$p$ : Hannah eats apples.

*not p*:

*not not p*:

3. More negations. Read the following and decide whether logging will continue.

*The House failed to overturn a veto on a bill that would stop logging."*

4. Complete the truth table given the following propositions. Then explain what you ate for breakfast in each case.

$p$ : I ate bacon for breakfast.

$q$ : I ate eggs for breakfast.

$p$	$q$	$p$ <b>and</b> $q$	<i>Explanation – What did you eat for breakfast?</i>

5. Given the conditional statement, complete the truth table. Refer to your notes for help if needed. (Note: "if p, then q" can be written in symbols as  $p \rightarrow q$ .)

"If I am elected, then I will reduce college tuition in Oregon."

$p$ : I am elected

$q$ : I will reduce college tuition in Oregon

$p$	$q$	if p, then q $p \rightarrow q$	Meaning – Have I told the truth?

6. Pizza Truth Table

Let P represent pepperoni, H represent ham, and M represent mushrooms.

a. Complete each row by determining whether each statement is true or false. Don't worry about the meaning yet.

P	H	M	P and H	H or M	P and H and M	not P	not M	not P or not M
T	T	T						
T	T	F						
T	F	T						
T	F	F						
F	T	T						
F	T	F						
F	F	T						
F	F	F						

b. Now that you have the table filled in, Identify the row for each type of pizza given.

Pepperoni and Mushroom Pizza: Row \_\_\_\_\_

Cheese Pizza: Row \_\_\_\_\_

Veggie Pizza (peppers, onions, mushrooms, olives): Row \_\_\_\_\_

Supreme Pizza (ham, pepperoni, sausage, olives, mushrooms, onions, peppers): Row \_\_\_\_\_

c. Explain the result (T or F), in the context of the pizza and its toppings.

i. Row 8 Column 9

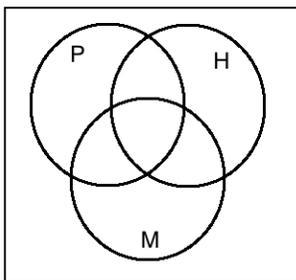
ii. Row 3 Column 4

**1.2: Sets and Venn Diagrams**

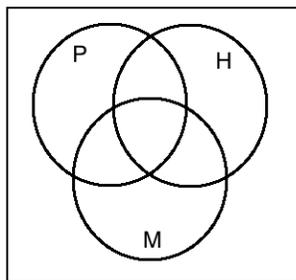
7. Pizza Venn Diagrams

Let's continue the last example with P representing pepperoni, H representing ham, and M representing mushrooms. Shade or color in the appropriate area(s) for each pizza on the Venn diagrams below.

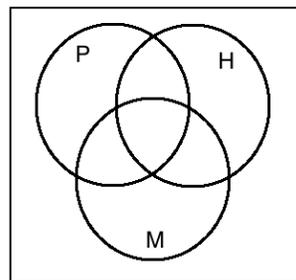
Pepperoni & Mushroom



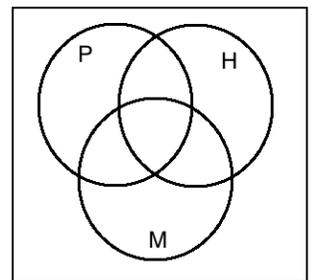
Cheese



Veggie



Supreme



**Qualified Propositions**

8. Draw a Venn diagram for each categorical proposition. Then write on the line whether the sets are disjoint, overlapping, or one is a subset of the other.

Relationship between the Sets

a. Some bikes are orange.

\_\_\_\_\_

b. All bicycles have wheels.

\_\_\_\_\_

9. Finding values for regions on a Venn diagram

150 people attending a concert were asked if they played piano, guitar, or drums.

10 could play all three.

73 could play guitar.

18 couldn't play any of these instruments.

21 could play piano and drums.

49 could play at least two of the instruments.

13 could play piano and guitar but not drums.

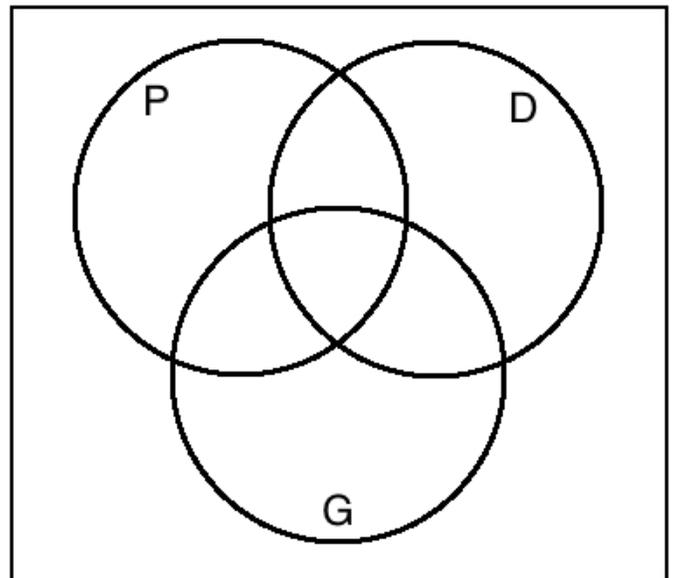
69 could play drums or guitar but not piano.

Let P represent piano,

G represent guitar, and

D represent drums.

Calculate and fill in the values for all eight regions.



## 1.4: Logical Fallacies

A **logical fallacy** is a type of flawed or misleading argument.

We are going to study six common fallacies (but there are many more that you can find on the internet). The fallacies are listed on the yellow and red cards (like fútbol or soccer penalty cards) with their descriptions on the back. Match one example card to each fallacy and write the name in the space provided.



## 6 Common Logical Fallacies

Fallacy	Description	Examples
	There is something wrong with the person or group making the claim, so the claim is not true.	"Vote against the healthcare bill because 'Lying Laura' supports it."
	There is no proof that the claim is true; therefore, it is false	"No one has proven it isn't Bigfoot in the photo, so it must be Bigfoot."
	An expert says the claim is true; therefore, it is true.	"Oprah Winfrey says Weight Watchers works so it must be very effective."
	A and B are the only options. A is false; therefore, only B can be true.	"Either those lights in the sky were an airplane or aliens. There are no airplanes scheduled for tonight, so it must be aliens."
	Presenting an oversimplified or distorted view of an argument and attacking the misrepresentation.	"Senator Khouri has proposed reducing military funding by 10%. Apparently, she wants to leave us defenseless against attacks by terrorists."
	A came before B; therefore, A caused B.	"Today I wore a red shirt, and my team won! I will wear a red shirt every time they play to make sure they keep winning."

**More Practice**

These problems can be used to check your understanding, help with online homework and study for tests. The answers can be found on my website.

**1.1 Truth Values**

1. Complete the truth table.

r	s	t	r and t	s or t	not (s or t)	If s then (r and t)	not r	If s then not r
T	T	T						
T	T	F						
T	F	T						
T	F	F						
F	T	T						
F	T	F						
F	F	T						
F	F	F						

**1.2 Sets and Venn Diagrams**

2. A survey was taken to see which professional sports were watched by students. Let F represent football, B represent basketball, and H represent hockey.

Answer the following questions (use complete sentences). Show any calculations that were used.

- How many students participated in the survey?
- How many students watched basketball?
- How many students watched only one of the sports?
- How many students watched at least two sports?
- How many students didn't watch hockey?
- How many students watched football and hockey, but not basketball?

