

1. Draw a Venn Diagram & Determine Validity of the Argument

a) All dogs are brown
All beagles are dogs
 All beagles are brown

c) All cats are mammals
Fluffy is a mammal
 Fluffy is a cat

b) No fruit is made of metal
No chalk is made of metal
 Some chalk is fruit

+ **Write the negation:** All cats are mammals

2. Draw a Venn Diagram and Draw a Valid Conclusion (if possible)

a) No insects are 2-legged
No dogs are 2-legged

c) Some chairs have wheels
All chairs are furniture

b) All paper products are fibrous
This cup is not fibrous

+ **Write the negation:** Some chairs have wheels

3. Define simple statements using p , q , r , etc. then translate each of the following into symbols.

- I will finish the puzzle if you come with me.
- If either you come with me or you help me, then I will finish the puzzle.
- Since you didn't help me, I didn't finish the puzzle.
- It is not true that you came with me or helped me.

4. Using the statements p = Today is Monday, q = Today is my birthday and r = It is dinner time, translate the following into English sentences.

- $(p \vee q) \rightarrow r$
- $\sim (p \wedge r) \rightarrow p$

5. Complete truth tables for the compound statements given in #4.

6. Which of the following statements are logically equivalent? (list **all** pairs/groups that are \equiv)

- The birds won't sing if it's not sunny.
- The birds will sing only if it's sunny.
- If the birds sing, then it's sunny.
- The birds will sing if it's sunny

- If the birds aren't singing, then it's not sunny
- It's not sunny if the birds aren't singing
- It's not sunny only if the birds aren't singing
- The birds sing if and only if it's sunny