

Math 156: Venn Diagrams In-class Exercise

For the following exercises involving Venn diagrams, show intermediate steps on separate sketches and label them clearly.

1. Represent the following logical propositions on a Venn diagram by shading in the appropriate regions.

(a) $p \wedge (\sim p \vee q)$

(b) $p \wedge q$

What can you conclude about the two logical expressions above?

2. Represent $q \vee (p \wedge q)$ on a Venn diagram by shading in the appropriate regions.

What can you conclude about this logical expression?

3. Represent $(p \vee q) \wedge (p \vee \sim q)$ on a Venn diagram by shading in the appropriate regions.

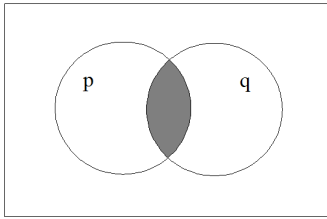
What can you conclude about this logical expression?

4. Represent $p \vee \sim r \wedge \sim q$ on a Venn diagram by shading in the appropriate regions.

5. Represent $\sim(p \wedge r) \vee \sim(q \vee r)$ on a Venn diagram by shading in the appropriate regions.

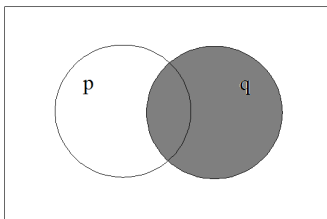
Answers:

1. Both expressions have the following Venn diagram.



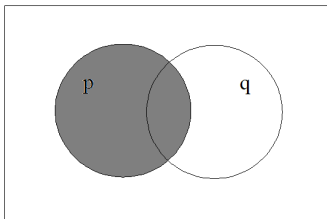
The two expressions are logically equivalent.

- 2.



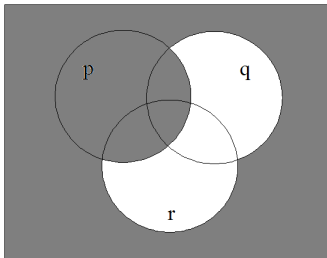
It is equivalent to q .

- 3.



It is equivalent to p .

- 4.



- 5.

