

1) (4 points each) Determine if the following are statements. If not, explain why not.

a) I think I liked that movie.

No, it's an opinion

b) A survey showed that 40% of viewers liked that movie.

Yes, can be true or false, not a ?, !.

2) (5 points each) Rewrite the following compound statements using $p, q, r, \wedge, \vee, \sim,$ and \rightarrow as needed. Be sure to declare what the letters $p, q,$ and r represent:

a) He is from England and he does not watch soccer.

p = He is from England

q = He watches soccer

$$p \wedge \sim q$$

b) If she read the book or plays the tuba, then we can be best friends.

p = ^{she} read the book

q = she plays the tuba

r = we can be best friend

$$(p \vee q) \rightarrow r$$

3) (5 points each) Let p = "I am on time." and q = "The race has begun." Translate the following into words:

a) $\sim p$

I am not on time

b) $p \wedge \sim q$

I am on time and the race has not begun.

4) (5 points) Let p and q be a true statements and let r be a false statement. Show the work to determine the truth value of the compound statement: $(p \wedge \sim q) \rightarrow r$.

$$(T \wedge \sim T) \rightarrow F$$

$$(T \wedge F) \rightarrow F$$

$$F \rightarrow F$$

T

33

5) (5 points each) Negate the following statements:

a) I'll be back.

I will not be back.

b) I am serious and don't call me Shirley.

I am not serious or
do call me Shirley.

c) If you build it, he will come.

You build it and
he will not come.

d) Nobody puts Baby in a corner.

Somebody puts
Baby in a corner.

6) (5 points each) For the statement "If you don't know where you want to go, then it doesn't matter which path you take." find the converse, inverse, and contrapositive:

Converse: If it doesn't matter which path you take,
then you don't know where you want to go.

Inverse: If you know where you want to go, then
it matters which path you take.

Contrapositive: If it matters which path you take,
then you know where you want to go.



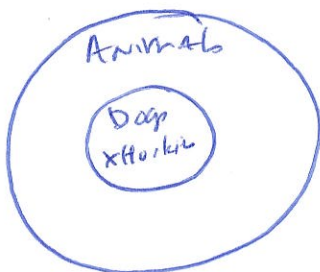
Fun Fact: The Cheshire Cat gives really good advice.

7) (5 points each) Use an Euler diagram to determine whether the argument is valid or invalid:

a) All dogs are animals.

All Siberian Huskies are dogs.

All Siberian Huskies are animals.

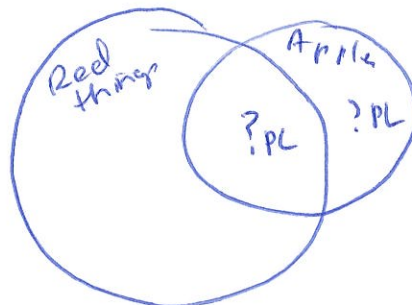


VALID

b) Some apples are red.

A pink lady is an apple.

A pink lady is red.



INVALID

3
45

8) (5 points) Rewrite the argument using $p, q, r, \wedge, \vee, \sim,$ and \rightarrow as needed. Be sure to declare what the letters $p, q,$ and r represent. **Do not create a truth table for it.**

All dogs are animals.
All Siberian Huskies are dogs.
 All Siberian Huskies are animals.

$p = \text{it is a dog}$
 $q = \text{it is an animal}$
 $r = \text{it is a Siberian Husky}$

| |
|-------------------|
| $p \rightarrow q$ |
| $r \rightarrow p$ |
| $r \rightarrow q$ |

9) (15 points) Fill in the truth table chart for the statement: $(p \vee q) \vee (p \wedge \sim r)$. Be sure to label the column headings.

| p | q | r | $p \vee q$ | $\sim r$ | $p \wedge \sim r$ | $(p \vee q) \vee (p \wedge \sim r)$ |
|-----|-----|-----|------------|----------|-------------------|-------------------------------------|
| T | T | T | T | F | F | T |
| T | T | F | T | T | T | T |
| T | F | T | T | F | F | T |
| T | F | F | T | T | T | T |
| F | T | T | T | F | F | T |
| F | T | F | T | T | F | T |
| F | F | T | F | F | F | F |
| F | F | F | F | T | F | F |

10) (2 points) Is the statement $(p \vee q) \vee (p \wedge \sim r)$ in number 9 a tautology? Why or why not?

Nope! Not all true.