

## Worksheet 9/6/2023

### Logical rules:

#### Negation

p	not p
T	F
F	T

#### AND

p	q	p and q
T	T	T
T	F	F
F	T	F
F	F	F

#### OR (inclusive OR)

p	q	p or q
T	T	T
T	F	T
F	T	T
F	F	F

#### If...then...

p	q	If p, then q
T	T	T
T	F	F
F	T	T
F	F	T

#### XOR (exclusive OR)

p	q	p xor q
T	T	F
T	F	T
F	T	T
F	F	F

### Practice:

Determine the form of the proposition (AND, OR, If...then...) State p and q. Then determine whether the proposition is true or false based on the truth tables above.

1. Dogs are animals and oak trees are plants.
2. 5 is greater than or equal to 4.
3.  $1 + 2 = 3$  and  $2 \times 3 = 5$ .
4. Not all men are tall and not all women are short.
5. Elephants are animals or elephants are plants.
6. If trees can walk then birds wear wigs.
7. If  $1 = 2$  then  $3 = 5$ .

8.  $2 = 2$  or  $2 = -2$ .

Decide whether each of the following statements makes sense, or is clearly true, or does not make sense, or is clearly false. Explain your reasoning.

9. My logical proposition is a question that you must answer.

10. The mayor opposes repealing the ban on handguns, so he must support gun control.

11. We intend to catch him, dead or alive.

12. When Li is feeling down, she listens to music. I saw her today listening to music, so she must have been feeling down.

Make a truth table for the given statement. Assume that  $p$ ,  $q$ ,  $r$  are propositions.

13.  $p$  and (not  $p$ )

14.  $p$  or (not  $p$ )

15.  $p$  or  $q$  or (not  $q$ )

16.  $p$  or ( $q$  and  $r$ )