

Solutions for homework on propositions and translations

Mr. Neeman. 10A, August 31, 2011

#H1. For each of the following, state whether it's a proposition or not, and, if it's a proposition also state whether it's a tautology, a contradiction, or contingent, and whether it's compound or simple.

(a) Everest is the highest mountain.

Proposition, contingent

(b) Either you will learn archery or you won't.

Proposition, tautology

(c) Why don't you tell me what time it is?

Not a proposition

(d) Owls are a type of mammal.

Proposition, contingent (it is true as a matter of biology, etc., not logic.)

(e) I know what you mean, but I don't know what you mean.

Proposition, contradiction

(f) What goes up must come down.

Proposition, contingent (it's true as a matter of physics, not logic)

(g) Do what you think is right.

Not a proposition

(h) Not all that glitters is gold.

Proposition, contingent

(i) Either I'll like the movie or I won't.

Proposition, tautology

(j) I like pine trees and I like cedars.

Proposition, contingent

#H2. Use the key below to translate the following propositions between English and logical notation.

p: Peggy voted for Lincoln.

q: The queen wore a funny hat.

r: The reverend is a good preacher.

s: Sarah can sing well.

(a) Either Peggy voted for Lincoln or Sarah can sing well.

$p \vee s$

(b) If the reverend is a good preacher, then the queen wore a funny hat.

$r \Rightarrow q$

(c) If Sarah can sing well, then Peggy didn't vote for Lincoln.

$s \Rightarrow \neg p$

(d) Either the reverend is a good preacher, or Sarah can sing well, but not both.

$r \underline{\vee} s$

(e) The queen wore a funny hat if and only if Sarah can't sing well.

$q \Leftrightarrow \neg s$

(f) The reverend is a good preacher and the queen wore a funny hat.

$r \wedge q$

(g) $p \wedge \neg q$

Peggy voted for Lincoln and the queen didn't wear a funny hat.

(h) $\neg q \Rightarrow \neg r$

If the queen didn't wear a funny hat then the reverend isn't a good preacher.

(i) $s \vee q$

Either Sarah can sing well or the queen wore a funny hat, but not both.

(j) $\neg(p \vee r)$

It's not the case that either Peggy voted for Lincoln or the reverend is a good preacher.

(k) $r \Leftrightarrow \neg r$

The reverend is a good preacher if and only if the reverend isn't a good preacher.

(l) If Peggy voted for Lincoln, then the queen didn't wear a funny hat.

$p \Rightarrow \neg q$

(m) Either the reverend is a good preacher or Peggy didn't vote for Lincoln.

$r \vee \neg p$

(n) The reverend is a good preacher if and only if Peggy voted for Lincoln.

$r \Leftrightarrow p$

(o) Either Sarah is a good singer, or the queen wore a funny hat, but not both.

$s \vee q$

(p) $q \vee \neg r$

Either the queen wore a funny hat or the reverend isn't a good preacher.