Student:Dong Liang

Homework: 2b

1.Based on the truth table for conjunction, can we know that "P^Q" will always be true exactly whenever "Q^P" is true?  Why or why not? (Briefly explain your answer; a couple-three sentences at most should be needed.)

Yes, it will always be true. The reason could be explained by a truth table:

|  |  |  |  |
| --- | --- | --- | --- |
| P | Q | Q^P | P^Q |
| T | T | T | T |
| T | F | F | F |
| F | T | F | F |
| F | F | F | F |
|  |  |  |  |

So, the table shows that one conjunction would be true only if both conjuncts are true. In this case, since we know P^Q will always be true, the P and Q will always be true also.

Thus, Q^P is ture.

2. How would you say the following things in FOL? Use the following symbolizations:

r = Robert, l = Laura, Human(x) = x is a human, Az(x) = x is an Arizonan.

Also, use only the truth-function connectives "~" and "^".

1. Robert is a human, and Laura is a human.

Human(r)^ Human(l)

1. Laura is a human, and Robert isn't.

~Human(r)^ Human(l)

1. Laura is a human and Arizonan.

Human(l)^ AZ(l)

1. Laura and Robert are both humans, but Laura is an Arizonan and Robert isn't.

Human(l)^ AZ(l)^ Human(r)^ ~AZ(r)

1. Neither Laura nor Robert are humans.

~Human(r)^~ Human(l)

Or

~ ( Human(r) V Human(l) )