7.20

4.

hasParty(Tweedledee) ↔ hasParty(Tweedledum)

hasParty(X) means “X gets a party”

5.

wentConcert(X,Y) This means X and Y went to concert togeth.

Likes(X,Y) This means X likes Y.

So, the answer is:

wentConcert(X,Y)→ (Likes(X,Y) ^ Like(Y,X)).

7.21

Set P as “Keanu Reeves is a great actor” and ~P is “Keanu Reeves is not a great actor”.

Set Q as “I am a monkey’s uncle” and ~Q is “I am not a monkey’s uncle”.

The truth table is:

|  |  |  |
| --- | --- | --- |
| P | Q | P→Q |
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 1 |
| 0 | 0 | 1 |

Since Q is always false, so it follows that P is not true.

Why is “A→ ⊥” equivalent to “~A”

Truth table:

|  |  |  |  |
| --- | --- | --- | --- |
| A | A→⊥ | ⊥ | ~A |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 |