* 1. p→q

p

q

valid

* 1. p → q

¬r →q

r

not valid

* 1. p ↔ r

r

p

not valid

2.1. p → s

q → r

p ∨ q

------

S

Not valid

2.2. p → s

q → r

p ∨ q

¬p

------

R

Valid

3.1. not valid

3.2. not valid

4.1. addition

4.2. modus ponens

5.1. modus ponens, hypothetical syllogism

5.2. modus tollens, hypothetical syllogism, addition