

MATH 210 Discrete Math – Session 7

Verify:  $p \rightarrow q \equiv \sim p \vee q$

Verify:  $\sim(p \rightarrow q) \equiv p \wedge \sim q$

Give a reason for each step in the following argument.

- 1)  $p \vee q$                       premise
- 2)  $q \rightarrow r$                     premise
- 3)  $p \wedge s \rightarrow t$             premise
- 4)  $\sim r$                             premise
- 5)  $\sim q \rightarrow u \wedge s$           premise
- 6)  $\sim q$                             \_\_\_\_\_
- 7)  $u \wedge s$                         \_\_\_\_\_
- 8)  $s$                                 \_\_\_\_\_
- 9)  $p$                                 \_\_\_\_\_
- 10)  $p \wedge s$                       \_\_\_\_\_
- 11)  $\therefore t$                             \_\_\_\_\_

Quantifiers:  $\forall$  and  $\exists$

$x + 3 = 0$

$y^2 + 1 > 0$

$\exists x \in \mathbf{R}, x + 3 = 0.$

$\forall x \in \mathbf{R}, x + 3 = 0.$

$\exists y \in \mathbf{R}, y^2 + 1 > 0.$

$\forall y \in \mathbf{R}, y^2 + 1 > 0.$

$\forall x \in \mathbf{R} \exists y \in \mathbf{R}, xy = 1.$

$\exists y \in \mathbf{R} \forall x \in \mathbf{R}, xy = y.$