

Math 2283 - Introduction to Logic

Quiz #16 - 2006.12.06

Solutions

Prove or disprove the justification for each step in the following proofs.

1. $P \Rightarrow \forall xQx \quad \therefore \forall x(P \Rightarrow Qx)$

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|----|-------------------------------|-----------------------|
| 1. | $P \Rightarrow \forall xQx$ | premise |
| 2. | P | assumption |
| 3. | $\forall xQx$ | \Rightarrow E, 1, 2 |
| 4. | Qx | \forall E, 3 |
| 5. | $P \Rightarrow Qx$ | \Rightarrow I, 2-4 |
| 6. | $\forall x(P \Rightarrow Qx)$ | \forall I, 5 |

2. $\exists x(P \Rightarrow Qx) \quad \therefore P \Rightarrow \exists xQx$

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|----|-------------------------------|-----------------------|
| 1. | $\exists x(P \Rightarrow Qx)$ | premise |
| 2. | $P \Rightarrow Qd^*$ | \exists E, 1 |
| 3. | P | assumption |
| 4. | Qd^* | \Rightarrow E, 2, 3 |
| 5. | $\exists xQx$ | \exists I, 4 |
| 6. | $P \Rightarrow \exists xQx$ | \Rightarrow I, 3-5 |