

# Math 2283 - Introduction to Logic

Quiz #17 - 2006.12.08

Solutions

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Fill in the missing pieces, both in the steps, and in the justification, to complete the proof.

$\exists x \forall y \neg Gxy$   
 $\therefore \neg \forall x \exists y Gxy$

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|----|---|----------------------|
| 1. | $\exists x \forall y \neg Gxy$                                      | Premise              |
| 2. | $\forall y \neg Gc^*y$  | $\exists E, 1$       |
| 3. | $\forall x \exists y Gxy$   | Assumption           |
| 4. | $\exists y Gc^*y$   | $\forall E, 3$       |
| 5. | $Gc^*d^*$   | $\exists E, 4$       |
| 6. | $\neg Gc^*d^*$  | $\forall E, 2$       |
| 7. | $(Gc^*d^* \wedge \neg Gc^*d^*)$                                     | $\wedge I, 5, 6$     |
| 8. | $\forall x \exists y Gxy \Rightarrow (Gc^*d^* \wedge \neg Gc^*d^*)$ | $\Rightarrow I, 3-7$ |
| 9. | $\neg \forall x \exists y Gxy$                                      | $\neg I, 8$          |