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| 1. | $\forall x(\exists y\exists zFyz \rightarrow (Gx \vee Fx))$ | A |
| 2. | Show $\exists yFya \rightarrow \exists x(Gx \vee Fx)$ | |
| 3. | $\exists yFya$ | ACP |
| 4. | Fba | $\exists E, 3$ |
| 5. | $\exists y\exists zFyz \rightarrow (Ga \vee Fa)$ | $\forall E, 1$ |
| 6. | $\exists zFbz$ | $\exists I, 4$ |
| 7. | $\exists y\exists zFyz$ | $\exists I, 6$ |
| 8. | $Ga \vee Fa$ | $\rightarrow E, 5, 7$ |
| 9. | $\exists x(Gx \vee Fx)$ | $\exists I, 9$ |

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|-----|--|------------------------------|
| 1. | $\exists xGx \rightarrow \forall y\forall zFxz$ | A |
| 2. | $\exists xHx \rightarrow \exists x\exists z\neg Fxz$ | A |
| 3. | Show : $\forall z\neg(Gz \& Hz)$ | |
| 4. | Show $\neg(Ga \& Ha)$ | |
| 5. | $Ga \& Ha$ | AIP |
| 6. | Ga | $\&E, 5$ |
| 7. | Ha | $\&E, 5$ |
| 8. | $\exists xGx$ | $\exists I, 6$ |
| 9. | $\exists xHx$ | $\exists I, 7$ |
| 10. | $\forall y\forall zFxz$ | $\rightarrow E, 1, 8$ |
| 11. | $\exists x\exists z\neg Fxz$ | $\rightarrow E, 2, 9$ |
| 12. | $\neg Fbc$ | $\exists\exists, 10$ (twice) |
| 13. | Fbc | $\forall E, 11$ (twice) |

Extra Credit (2pts.)

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| 1. | $\forall x(\exists yFxy \rightarrow \forall yFyx)$ | A |
| 2. | $\exists x\exists yFxy$ | A |
| 3. | Show: $\forall x\forall yFxy$ | |
| 4. | Show Fab | |
| 5. | $\exists yFcy$ | $\exists E, 2$ |
| 6. | $\exists yFcy \rightarrow \forall yFyc$ | $\forall E, 2$ |
| 7. | $\forall yFyc$ | $\rightarrow E, 5,6$ |
| 8. | Fbc | $\forall E, 7$ |
| 9. | $\exists yFby \rightarrow \forall yFyb$ | $\forall E, 1$ |
| 10. | $\exists yFby$ | $\exists I, 10$ |
| 11. | $\forall yFyb$ | $\rightarrow E, 9,10$ |
| 12. | Fab | $\forall E, 11$ |

WYD