Inference Rules for Predicate Logic

Fill in blanks.

1. 1. $\neg\exists x Fx \vdash \neg Fk$ ..... premise
   2. $\neg\exists x Fx \vdash$ __ ..... 1,∀I

2. 1. $Fk \supset Gk \vdash Hc$ ..... premise
   2. __ $\vdash \forall x Hx$ ..... 1,∀I

3. 1. $\exists x(Gx \vee Hx) \vdash Fa$ ..... premise
   2. __ $\vdash$ __ ..... 1,∀I

4. 1. $Fa \vdash \forall x(Hx \supset Px)$ ..... premise
   2. $Fa \vdash$ __ ..... 1,∀E
   3. $Ha \vdash Ha$ ..... A
   4. $Fa, Ha \vdash Pa$ ..... 2,3,⊃E

5. 1. $Fa \vdash \forall x(Hx \supset Px)$ ..... premise
   2. __ $\vdash$ __ ..... 1,∀E
   3. $Hb \vdash Hb$ ..... A
   4. $Fa, Hb \vdash Pb$ ..... 2,3,⊃E

6. 1. $\exists x Qx \vdash \exists x Qx$ ..... A
   2. $Qa \vdash \exists x Rx$ ..... premise
   3. __ $\vdash$ __ ..... 1,2,∃E

7. 1. $Qb \vdash Qb$ ..... A
   2. __ $\vdash$ __ ..... 1,∃I

8.

1.	Γ	$\vdash \exists z W z \supset \exists z M z$	..... premise
2.	Δ	$\vdash W a$	..... premise
3.	Δ	$\vdash \_\_$	..... 2,$\exists$I
4.	Γ, Δ	$\vdash \exists z M z$	..... 1,3,$\supset$E

9.

1.	$\exists x F x$	$\vdash \exists x F x$	..... premise
2.	$F a$	$\vdash F a$	..... A
3.	$\_\_$	$\vdash \_\_$	..... 2,$\exists$I
4.	$\exists x F x$	$\vdash \exists y F y$	..... 1,3,$\exists$E

10.

1.	$\exists x(R x \vee F x)$	$\vdash \exists x(R x \vee F x)$	..... A
2.	$R a \vee F a$	$\vdash R a \vee F a$	..... A
3.	$\forall x[(R x \vee F x) \supset W x]$	$\vdash \forall x[(R x \vee F x) \supset W x]$	A
4.	$\forall x[(R x \vee F x) \supset W x]$	$\vdash \_\_$	..... 3,$\forall$E
5.	$\forall x[(R x \vee F x) \supset W x], R a \vee F a$	$\vdash W a$	..... 2,4,$\supset$E
6.	$\forall x[(R x \vee F x) \supset W x], R a \vee F a$	$\vdash \exists x W x$	..... 5,$\exists$I
7.	$\_\_$	$\vdash \_\_$	..... 1,6,$\exists$E

11.

1.	$\exists x \forall y L y x$	$\vdash \exists x \forall y L y x$	..... A
2.	$\forall y L y r$	$\vdash \forall y L y r$	..... A
3.	$\forall y L y r$	$\vdash L d r$	..... 2,$\forall$E
4.	$\forall y L y r$	$\vdash \exists x L d x$	..... 3,$\exists$I
5.	$\forall y L y r$	$\vdash \_\_$	..... 4,$\forall$I
6.	$\_\_$	$\vdash \forall y \exists x L y x$	..... 1, 5,$\exists$E