

Math 2283 - Introduction to Logic

Homework #7 - 2006.10.26

Due Date - 2006.11.01

Solutions

Determine which of the following formulas are wff's. Here, G is a two-place predicate and R a three-place predicate.

1. $\forall x (\exists y Gxy \vee Rxz)$

Not a wff.

2. $\forall x \exists y Gxy \vee Rxyz$

Not a wff.

3. $\forall x \exists y (Gxy \vee \neg Rxyz)$

Is a wff.

4. $\forall x \exists y (Gxy \vee Rxy)$

Not a wff.

5. $\exists y (Gxy \Rightarrow \forall z Rxyz)$

Is a wff.

6. $\forall x \exists y (Gxx \vee Rxyz) \wedge \forall z Gzx$

Not a wff.

7. $\forall x (\exists y (Gxy \vee Rxyz) \wedge \forall z Gzx)$

Is a wff.

Which of the following wff's are open and which are closed? If the wff is open, underline all free variables. Here, G is a two-place predicate and R a one-place predicate.

8. $\exists y \forall x (Gxy \vee R\underline{z})$

Open.

9. $\exists y \forall x (Gxy \vee Rx)$

Closed.

10. $(\exists y \forall x Gxy \vee R\underline{x})$

Open.

11. $(\exists y \forall x Gxy \vee R\underline{y})$

Open.

12. $(\exists y \forall x Gxy \vee \forall x Rx)$

Closed.

13. $\exists x (\forall y Gxy \Rightarrow R\underline{y})$

Open.

14. $\exists x (\forall y Gxy \Rightarrow Rx)$

Closed.