

Practice Questions

- 1. Which of the following are wffs in predicate logic? If it is, draw its syntactic structure.
 - a. $P(x,y) \to Q(p)$
 - b. $\exists x[(R(x,x,x))]$
 - c. $\exists y [\forall x [P(q,y)]]$
 - d. $\forall x[\exists y[P(q,y) \land \lor (P(x,q))]]$
 - e. $P(y) \wedge \exists x [Q(x)]$



Solutions

- 1. Which of the following are wffs in predicate logic? If it is, draw its syntactic structure.
 - a. $P(x,y) \to Q(p)$ Yes

$$\begin{array}{cccc} P(x,y) \to Q(p) \\ \hline \\ P(x,y) & \to & Q(p) \\ \hline \\ P & x & y & Q & p \end{array}$$

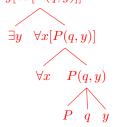
b. $\exists x[(R(x,x,x))]$ - Yes

$$\exists x [(R(x,x,x))]$$

$$\exists x R(x,x,x)$$

$$R x x x x$$

c. $\exists y [\forall x [P(q,y)]]$ - Yes $\exists y [\forall x [P(q,y)]]$



- d. $\forall x[\exists y[P(q,y) \land \lor (P(x,q))]]$ No
- e. $P(y) \wedge \exists x [Q(x)]$ Yes

