

This project asks you to verify that two common forms of quantified statements can be expressed in what is called “prenex normal form” (see the discussion before problems 50-52 of the text).

- (a) Find the prenex normal form of $\exists xP(x) \vee \exists xQ(x)$.
- (b) (i) Explain why the prenex normal form of $\exists xP(x) \wedge \exists xQ(x)$ is *not* $\exists x (P(x) \wedge Q(x))$.
(ii) Give the prenex normal form of $\exists xP(x) \wedge \exists xQ(x)$.
- (c) Give the prenex normal form of $\forall xP(x) \vee \forall xQ(x)$.
- (d) Give the prenex normal form of $\forall xP(x) \wedge \forall xQ(x)$.
- (e) Give the prenex normal form of $\forall xP(x) \wedge \exists xQ(x)$.
- (f) Give the prenex normal form of $\forall xP(x) \vee \exists xQ(x)$.
- (g) *Prove* one of (a), (bii), (c), (d), (e), or (f). State which one you are proving.