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 $\exists x P(x) \vee \exists x Q(x)$.

(b) (i) Explain why the prenex normal form of $\exists x P(x) \wedge \exists x Q(x)$ is *not* $\exists x\,(P(x) \wedge Q(x))$.

(ii) Give the prenex normal form of $\exists x P(x) \wedge \exists x Q(x)$.

(c) Give the prenex normal form of $\forall x P(x) \vee \forall x Q(x)$.

(d) Give the prenex normal form of $\forall x P(x) \wedge \forall x Q(x)$.

(e) Give the prenex normal form of $\forall x P(x) \wedge \exists x Q(x)$.

(f) Give the prenex normal form of $\forall x P(x) \vee \exists x Q(x)$.

(g) *Prove* one of (a), (bii), (c), (d), (e), or (f). State which one you are proving.