Consider the following collection of relation schemes:

professor(**profname**, deptname)

department(**deptname, building**)

committee(**commname, profname**)

a. Find all the professors who are in any one of the committees that Professor Smith is in.

b. Find all the professors who are in at least all those committees that Professor Smith is in.

c. Find all the professors who are in exactly (i.e., no more and no less) all those committees that Professor Smith is in.

d. Find all the professors who have offices in at least all those buildings that Professor Smith has offices in.

Sample answers:

a. $\pi_{A.profname}(\sigma_{B.profname=\text{"Smith" and } A.commname=B.commname}(\rho_A(committee) \times \rho_B(committee)))$

b. committee / $[\pi_{commname}(\sigma_{profname=\text{"Smith"}}(committee))]$

c. In b above, we get profname who are in at least the committees that Smith is in. For this question, now we need to remove those profs who are in a committee that Smith is not in. This latter part is:

$\pi_{A.profname}\ \sigma_{A.commname = B.commname}\ \{[\pi_{B.commname}(\rho_B(committee)) - [\pi_{commname}(\sigma_{profname=\text{"Smith"}}(committee))]]\ X\ \rho_A(committee)\}$

Thus, the full expression is the expression in b "minus" the above expression.

d. $\pi_{A.profname, B.building}\ \sigma_{A.deptname = B.deptname}\ [\rho_A(professor) X \rho_B(department)]$ /

$\pi_{D.building}\ \sigma_{C.deptname = D.deptname \text{ and } C.profname = \text{"Smith"}}\ [\rho_C(professor) X \rho_D(department)]$