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Assignment 12 Quiz 9 Pt 2

**Question 2**

T and W are transitive relations on a set A. Prove or disprove the following statement:

 [T U (T ∩ W)] ∩ W   is transitive.

**Proof:**

[T U (T ∩ W)] ∩ W   -> T ∩ W

Let (x, y), (y, z) be elements of T ∩ W.

(x, y), (y, z) are elements of T and (x, y), (y, z) are elements of W.

(x, z) is an element of T and W (both are transitive).

Thus, (x, z) is an element of T ∩ W.

Therefore, T ∩ W is transitive and because T ∩ W = [T U (T ∩ W)] ∩ W, [T U (T ∩ W)] ∩ W is transitive.