Homework #12

Name _____ Sec ____

Questions:	Answers:
1. Given the universal set U = {a, b, c, d, e, f, 1, 2, 3, 4, 5, 6, 7, 8, 9} let A = {a, b}, B = {a, c, 2, 4, 6}, C = {1, 2, 3, 4} and D = ∅. Evaluate each expression: a) |D| b) D ∈ A c) $\bar{B}$ d) A ∩ B e) (U – B) ∪ C f) C ⊆ B	a) |D| = 0 b) D ∈ A = false c) $\bar{B}$ = {d, e, f, 1, 3, 5, 7, 8, 9} d) A ∩ B = {a} e) (U – B) ∪ C = {d, e, f, 1, 2, 3, 4, 5, 7, 8, 9} f) C ⊆ B = true
2. Prove: A ∩ A = A Use the definition of ∩. Justify each step in your proof. (Hint: convert left side to right side.)	

6. Using set laws, reduce: ((A ∪ B) ∩ (*U* ∪ ~ B)) ∪ (~ B ∪ (B ∩ ~ C) ∪ C) to *U* (the universe of all elements). Justify each transformation with one or more laws.	
7. Given the universal set: *U* = {a, b, c, d, e, f, 1, 2, 3, 4, 5, 6, 7, 8, 9} let A = {a,b}, B={a,c,2,4,6}, C= {1,2,3,4} and D=∅. Evaluate each expression: a) A · B b) the relation on A · C in which the second element of the ordered pairs is larger than 3.	a) A × B = {(a, a), (a, c), (a, 2), (a, 4), (a, 6), (b, a), (b, c), (b, 2), (b, 4), (b, 6)} b) {(a, 4), (b, 4)} c) 40 d) C × D is a subset of A × B

c) $\lvert A \cdot B \cdot C \rvert$ d) $C \cdot D \subseteq A \cdot B$	