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CIS7- FALL17

1. ***Show that (p->q) and (q' -> p') are logically equivalent without using truth tables or a "contrapositive" law (don't assume they are true)***

    a. (p’vq)<=>(q’->p’) implication
    (p’vq)<=>(q’’vp’) implication
    (p’vq)<=>(qvp’) double negation
    (p’vq)<=>(p’vq) communative property

2. ***Show that (p->r) ^ (q->r) <=> (p v q) -> r***

    a. (p’ v r) ^ (q->r) <=> (p v q) -> r implication
    (p’ v r) ^ (q’v r) <=> (p v q) -> r implication
    (p’v r) ^ (q’v r) <=> (p v q)’ v r implication
    (r v p’) ^ (r v q’) <=> (p v q)’ v r communative property
    r v (p’^q’) <=> (p v q)’ v r distribution
    r v (p’^q’) <=> (p’ ^ q’) v r negation
    r v (p’^q’) <=> r v (p’ ^ q’) communative property

3. ***Come up with 2 more questions like the ones above. Incorporate the logic laws we discussed in class. Your questions will be used in the next class' lab***

    a. [(P->Q) ^ R] <=> [(Pv R’) ^ (Q’ v R’)]’ negation
    [(P’v Q) ^ R] <=> (P’ ^ R) v (Q ^ R) implication
    (P’ ^ R) v (Q ^ R) <=> (P’ ^ R) v (Q ^ R) distribution

    b. P ^ (Q->R) <=> (P ^ Q’) v (P^R)
    P ^ (Q’ vR) <=> (P ^ Q’) v (P^R) implication
    (P ^ Q’) v (P^R)<=> (P ^ Q’) v (P^R) distribution