Break Room: 2
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Exercise I (A)

Identify the main operator in the following propositions

1. Conjunction
2. Equivalence
3. Implication
4. Disjunction
5. Implication
6. Negation

Exercise II (B)

1) A * X = T * F = **F**
4) ~C V Z = F V F = **F**
7) ~X ⊃ Z = T ⊃ F = **F**
10) ~(A * ~Z) = ~(T * T) = ~T = **F**
13) (A * Y) V (~Z * C) = (T * F) V (T * T) = F V T = **T**
16) (C ≡ ~A) V (Y ≡ Z) = (T ≡ F) V (F ≡ F) = F V T = **T**
19) ~[~(X ⊃ C) ≡ ~(B ⊃ Z)] = ~(~(F ⊃ T) ≡ ~(T ⊃ F)) = ~(~(T) ≡ ~(F)) = ~(F ≡ T) = ~(F) = **T**
22) ~[(A ≡ X) ∨ (Z ≡ Y)] ∨ [(~Y ⊃ B) * (Z ⊃ C)] = ~[(T ≡ F) ∨ (F ≡ F)] ∨ [(T ⊃ T) * (F ⊃ T)] = ~[F ∨ T] ∨ [T * T] = ~(T) ∨ T = F V T = **T**
25) (Z ⊃ C) ⊃ {[(~X ⊃ B) ⊃ (C ⊃ Y)] ≡ [(F ⊃ T) ⊃ (T ⊃ F)]} = (F ⊃ T) ⊃ {[(T ⊃ T) ⊃ (T ⊃ F)] ≡ [(F ⊃ F) ⊃ (T ⊃ F)]} = T ⊃ {[T ⊃ F] ≡ [T ⊃ F]} = T ⊃ {F ≡ F} = T ⊃ T = **T**

Exercise III (C)

10) True
15) True
20) False
25) False

Exercise IV (D)

P -> ~ (P · Q)

~P V (~P V ~Q)
~P V ~Q
~(P ∧ Q)

P	Q	P • Q	~(P • Q)
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

Exercise V (E)

(P ∨ ~ Q) ≡ R

P	Q	R	~Q	P V ~Q	(P ∨ ~ Q) ≡ R
0	0	0	1	1	0
0	0	1	1	1	1
0	1	0	0	0	1
0	1	1	0	0	0
1	0	0	1	1	0
1	0	1	1	1	1
1	1	0	0	1	0
1	1	1	0	1	1

Exercise VI (F)

1. In order to become a PHYSICIAN (P), it is necessary to RECEIVE an M.D. (R) and do an INTERNSHIP.

   (R • I) -> P

2. In order to PASS, it is both necessary and sufficient to average at least FIFTY.

   (~F → ~P) • (F → P)

3. Getting a HUNDRED on every exam is sufficient, but not necessary, for ACING intro logic.

   (H → A) • ~(~H → ~A)

4. TAKING all the exams is necessary, but not sufficient, for ACING intro logic.

   (~T → ~A) • ~(T → A)

5. In order to get into MEDICAL school, it is necessary but not sufficient to have GOOD grades and take the ADMISSIONS exam.

   (~(G • A) → ~M) • ~((G • A) ⊃ A)

6. In order to be a BACHELOR it is both necessary and sufficient to be ELIGIBLE but not MARRIED.

   [~(E • ~M) → ~B] • [(E • ~M) → B]

7. In order to be ARRESTED, it is sufficient but not necessary to COMMIT a crime and GET caught.

   [(C • G] ⊃ A] • ~[~(C • G) ⊃ ~A]

8. If it is RAINING, I will play BASKETBALL; otherwise, I will go JOGGING.

   (R ⊃ B) • (~R ⊃ J)

9. If both JAY and KAY are home this weekend, we will go to the BEACH; otherwise, we will STAY home.

   ((J • K) ⊃ B) • (~(J • K) ⊃ S)

10. JONES will win the championship unless he gets INJURED, in which case SMITH will win

    (~I ⊃ J) • (I ⊃ S)