**Assignment 2**

1)

f(p,q,r) = ¬p v q → r

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **p** | **q** | **r** | **¬p** | **¬p v q** | **¬p v q → r** |  |
| T | T | T | F | T | T | **(p^q^r) v** |
| T | T | F | F | T | F |  |
| T | F | T | F | F | T | **(p^¬q^r) v** |
| T | F | F | F | F | T | **(p^¬q^¬r) v** |
| F | T | T | T | T | T | **(¬p^q^r) v** |
| F | T | F | T | T | F |  |
| F | F | T | T | T | T | **(¬p^¬q^r)** |
| F | F | F | T | T | F |  |

***(p^q^r) v (p^¬q^r) v (p^¬q^¬r) v (¬p^q^r) v (¬p^¬q^r)***

2) Query:

SELECT FIRSTNAME, LASTNAME, SID

FROM STUDENT

WHERE SID IN

(SELECT StudentID

FROM ENROLLED

WHERE CourseID IN

(SELECT CID

FROM COURSE

WHERE CourseNr < 420))

Table:

|  |  |  |
| --- | --- | --- |
| FIRSTNAME | LASTNAME | SID |
| Prakash | Patel | 75234 |
| Marcus | Brennigan | 90421 |

3)

a) {x: x is zero or divisible by 3 and less than or equal to 12}

b) {x: -3 <= x <= 3}

4) B A, C A, C D

5) A ∩ (B U C) = (A ∩ B) U C

This statement is false. I have found that when A = {2,3}, B = {3,4}, and C = {4,6} both sides are not equal.

A ∩ (B U C) = (A ∩ B) U C

{2,3} ∩ ({3,4} U {4,6}) = ({2,3} ∩ {3,4}) U {4,6}

{2,3} ∩ ({3,4,6}) = ({3}) U {4,6}

{3} = {3,4,6} *This is a false statement.*

6)

a) A = {1,2,3,4} and B = {3,4,5,6,}

({1,2,3,4} - {3,4,5,6,}) U ({3,4,5,6,} - {1,2,3,4})

({1,2}) U ({5,6})

{1,2,5,6} = A Δ B

b) If A Δ B is an empty set then A is equal to B.

7)

i) When both A and C merely have some of their elements in common this will be true:

ii) When A = B = C this will be true:

iii) When A = B and C is a subset of B and A this will be true:

iv) When C = B and A is a subset of C and B this will be true:

v) When A is a subset of C, which in turn is a subset of B, this will be true:

vi) When C is a subset of A, which in turn is a subset of B, this will be true:

vii) When C and A are equal, which are subsets of B, this will be true:

8) I found the SQL trials to be the most interesting; I became a little bogged down with all the different information on sets. The most frustrating thing was not being able to see the database we were querying when you gave us the in class exercise because we couldn’t know what elements specifically we needed to look at without the table (ex: CID vs CourseNr, ect.) .

9) Step 1: Fill the 3-quart bucket

Step 2: Empty the 3-quart bucket into the 5-quart bucket

Step 3: full the 3-quart bucket

Step 4: Fill the 5-quart bucket with the 3-quart supply, leaving exactly 1 quart of water in the 3-quart bucket.

Step 5: Empty the 5-quart bucket

Step 6: Put the 1 quart of water from the 3-quart bucket into the 5-quart bucket.

Step 7: Fill the 3-quart bucket

Step 8: Empty the 3-quart bucket into the 5-quart bucket giving you exactly 4 quarts of water in the 5-quart bucket.