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HOMEWORK "2"

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1.6 Rules of Inference:

Q4/

1. Conjunction of two propositions and asserted one of them.

2. Disjunction of two propositions and the negation of one of them.

3. Modus ponens

4. Addition

5. Hypothetical syllogism

Q24/

➔Steps 3 and 5 are "errors", simplification applies to conjunctions, not disjunctions.

1.7 Introduction to Proofs

Q2/

➔ A = 2s , b=2t , a + b = 2s + 2t = 2(s + t) .

Suppose that a and b are two even integers. Then there exist integers s and t such that a = 2s and b = 2t . Adding, we obtain a + b = 2s+2t = 2(s + t). Since this represents a + b as 2 times the integer s + t , we conclude that a + b is even .

Q6/

➔ Odd number is in form 2n+1. So, we have 2 odd number 2a+1 and 2b+1

The product is (2a+1) (2b+1) = 4ab+2a+2b+1 =2(2ab+a+b) +1

So, the product of 2 odds number is odd.

Q18/

Let p: m*n is event.
H: m is event.
L: n is event.
(M v n)
Using prove by Contraposition, not (m v not p
So: m is odd and n is odd
m= 2k +1
n= 2l +1
M*n = (2k +1)*(2l+1) = 4kl + 2k + 2l + 1 = 2(2kl +k + l) +1, let (2kl +k + l) = v
So m*n = 2v +1 so m*n is odd
By Cont.

Q20/

a: We proof that:

$n = 2k + 1$

And $n = 2k + 1$ when $3n+ 2$ that $3(2k+1)+2$

$6k+3+2 = 6k+4+1=2(3k+2) +1$

We can find integer $l = 3k +2$

$3n+2=2l+1$ that means $3n+2$ is odd

B :

We proof that :

$n = 2k + 1$

and $n = 2k + 1$ when $3n+ 2$ that $3(2k+1)+2$

$6k+3+2 = 6k+4+1=2(3k+2)+1$

We can find integer $l = 3k +2$

$3n+2=2l+1$ that means $3n+2$ is odd

That means $3n +2$ is odd so our assumption n is odd the contradiction that $3n+2$

Is both even and odd n is oddmust be afalse statement

Sec 2.1 Sets

Q2.

a) {x € N|x is a mutiple of 3 and x≤12 }

b) {x € Q | -3 ≤ x ≤ 3 }

c) {x|x is a letter in the alphabet from m to p }

Q12 .

a) True
b) True
c) False
d) True
e) True
f) True
g) False

Q22 .

a.) 0

b.) 1

c.) 2

d.) 3

Q28.

Let (a , b) be an element of A × B where a ∈ A and b ∈ B. Because A ⊆ C, we know that a ∈ C ; similarly, b ∈ D. Therefore (a, b) ∈ C × D.

2.2 Set Operations

Q4.

a) {a, b, c, d, e, f, g, h}
b) {a, b, c, d, e}
c) {}
d) {f,g, h}

Q14.

Since A = (A − B) ∪ (A ∩ B), SO A = {1, 5, 7, 8} ∪ {3, 6, 9} = {1, 3, 5, 6, 7, 8, 9}. And B = (B − A) ∪ (A ∩ B) = {2, 10} ∪ {3, 6, 9} = {2, 3, 6, 9, 10}.

Q26.

First suppose x is in the left-hand side. Then x must be in a but in neither B nor C . Thus x ∈ A − C , but x ∉ B − C , so x is in the right-hand side. Next suppose that x is in the right-hand side. Thus x must be in A − C and not in B − C . The first of these implies that x ∈ A and x ∉ C . But now it must also be the case that x ∉ B, since otherwise we would have x ∈ B − C . Thus we have shown that x is in A but in neither B nor C , which implies that x is in the left-hand side.