Midterm CM1020 coursework assignment - [dp261@london.ac.uk](mailto:dp261@london.ac.uk)

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## Question 1

(a)

### 10 is in all three so X ∩ Y ∩ Z = { 10 }

( X \ Z) is the { 4, 6, 8 }

X ∪ (X \ Z) = { 2, 4, 6, 8, 10 }

1. X = { 2, 4, 6, 8, 10 }

The values of all X must be in the other two sets, however this is False. So X cannot be a subset

1. P ( X union ( Y and Z)) , therefore:

P(X ∪ (Y ∩ Z)) = { 2, 4, 6, 8, 10, 12 } = = 64

(b)

Powerset (A) subset { , All empty sets , we test this

{ , {}} will be an empty set of the set and the general empty set = A could be a subset of these

{{ }} is a nested subset, however this set would be an empty set and a single set like { , {}}

Therefore both would be equal, the powerset of these two would then True

(c)

A ⊆ B ( if and only if) A ∩ C ⊆ B ∩ C for all sets of C

I will try disapprove this statement:

A ⊄ B, however A ∩ C subset B ∩ C for all C

A = {1}, B = {∅}, ∴ A ⊄ C, hence true

A ∩ C = {1} but B ∩ C = ∅

And {1} cannot be a subset of {∅}, so fail and the statement is True

(d)

If A ⊆ B and C ⊆ B`, then A ∩ C = ∅ B` = complement of B

Universal Set U.

So if A is a subset of B , and C is a subset of B`

A ∩ B ⊆ C ∩ `B , A and C = empty set

Therefore: A is in B, C are not in B , they can not share elements

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## Question 2

## (a)

I. so then the equation will be undefined. However the real number can be negative, zero or positive. **Is a function**

II. This is an exponential function, As a set of integers can be positive, zero or negative. **Is a function**

III. This is a parabola , A real number can follow negative, positive or zero. This means cannot happen. However it passes the function test so **it is a function.**

b)

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## Question 3

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## Question 4

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## Question 5