**Lesson 0**

<https://math.libretexts.org/Courses/Monroe_Community_College>

Set Theory

**Subset**

if and only if

Set A is a subset of set B, denoted by , if every element of A is also an element of B.

To prove

1. Let be an arbitrary element of set .

2. Show is an element of set .

**Equal Sets**

Transitivity of subsets: Let , , and be sets. If and , then .

To prove sets equal

1. Show that

2. Show that

**Proper Subset**

The set is a proper subset of , denoted , if is a subset of , and .

For any set , we have and . In particular, .

**Powerset**

The set of all subsets of is called the power set of , denoted

From MAT2612:

Example: is the poset a lattice?

Therefore, is a lattice

Remember that:  
 *number of elements in*

*number of elements in the empty set*

*number of elements in the powerset*

*number of elements in the empty set*

Also:

. *every set is a subset of itself*

**Lesson 0**

<https://math.libretexts.org/Courses/Monroe_Community_College/MATH_220_Discrete_Math/5%3A_Functions/5.4%3A_Onto_Functions_and_Images%2F%2FPreimages_of_Sets>

Onto Functions and Images/Preimages of Sets

**Image of a Set**

Given a function , and , the image of under is defined as

*is the set of all the images of the elements of*

**Preimage of a Set**

Given a function , and , the image of under is defined as

*is the set of all the images of the elements of*