## 1 Set Theory

To demystify mathematics consider

- (i) What is a theorem?
- (ii) What is a proof?

What if we don't know the answer?

To begin we need

- (a) an example(s)
- (b) a nearly related concept

To dempetify mathematics, consider (i) What is a Theorem? (ii) What is a Proof? (ii) what is a Proof? What if we don't know we need (a) an example (s) (b) a nearby related concept Related Concept: Greek Syllogism example:

- 1. All men are mortal.
- 2. Socrates is a man.
- 3. Therefore, Socrates must die.

To analyze, recast in set theoretic terms via Venn Diagram.

Pelated Concept:
Thek Syllogism
Example:
(1) All men are mortral
(1) All men are mortral
(2) fociates is a man
(2) fociates is a man
(3) fociates is a must die
(4) fociates is a must die
(5) fociates is a must die
(6) fociates is a must die
(7) fociates is a must die
(8) fociates is a must die
(9) fociates is a must die
(10) fociates is a must die
(11) fociates is a must die
(12) fociates is a must die
(13) fociates is a must die
(13) fociates is a must die
(14) fociates is a must die
(15) fociates is a must die
(16) fociates is a must die
(17) fociates is a must die
(18) fociates is a must die
(1

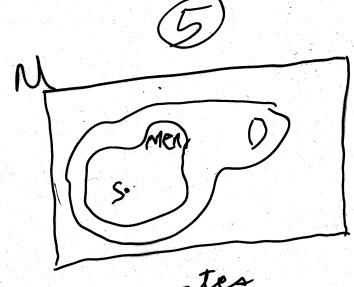


S: Socrates

M: Set of Men

D: Things that will die

 $\mathcal{U}$ : Things on Earth



S: sociates M: set of men D: things that die U: things on earth U: things on earth

- 2 Generate  $\mathbb{N}$
- 3 From  $\mathbb{Z}$  to  $\mathbb{R}$  via ordering
- 4 Sequence and Limits
- 5 Limit and Convergence
- 6 Infinite Series
- 7 Metric Spaces Part 1
- 8 Metric Spaces Part 2

Call them  $C_1, C_2, \dots, C_L$ 

Suppose some pairs (i,j) of cities  $C_i$  and  $C_j$  are adjacent in that they are linked by a non-stop road of some positive, finite, known distance. gij

When is there a path by car between every two cities?

Ans Let  $A=(a_{ij})$  be an  $L\times L$  incidence matrix where  $a_{ii}$  =1 and for  $i\neq j$