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1). What is:
- an axiom is a basic assumption about mathematical structured that need no proof. It is a premise so evident as to be accepted as true without controversy.
- b. proof is demonstrate that a particular statement is true. A proof consists of a sequence of statement that form an argument.
- c. direct proof an implication p->q can be proved by showing that if p is true, then q is also true.
- d. indirect proof an implication p->q is equivalent to its contra -positive $\neg q \to \neg p$. Therefore, we can prove p->q by showing that whenever q is false, then is also false.
- e. rule of inference is provide the justification of the steps used in a proof.
- f. fallacies is cases of incorrect reasoning.
- g. theorem is a statement that can be shown to be true.
- h. corollary is a proposition that follows directly from a theorem that has been proved.
- i. lemma is a simple theorem used as an intermediate result in the proof of another theorem.
- J. conjecture is a statement whose truth value is unknown. Once it is proven, it becomes a theorem.

2) argument is valid, if whenever all its hypotheses are true, its conclusion is also true.

3) The components of an argument are : Premises and Conclusion.

4) Examples of:
- a>>"Addition" : Let a and b be complex numbers.

  Then a + b is also a complex numbers and ab is also a complex numbers too.
- b>> "Simplification" If "dog can swim and can run fast" is true, then "dog can swim" is also true.
- C>>"Conjunction" If the following statements are true:
  "Rabbits are running fast."
  "Turtle are running slow."
  Then the statement "Rabbits are running fast, and '' Turtle are running slow." is also true.
- d>>"Modus tollens"? If the following statements are true:
  "If I get up late then I missed class"
  "I don't missed class."
  Then the statement "I get up early" is also true.
- e>>"Hypothetical syllogism" "if there is an accident, then there will be ambulance"

and "if there is ambulance, then the ambulance alarm will beep" are true.

Then "if there is an accident, the ambulance alarm will beep" is also true.

- f>> "Disjunctive syllogism" If the statement:

  "It is so hot or there is not raining " is true

  and it is not so hot, then it must be not raining.