1. Discuss the falsifiability of the following statements. Justify your answer. If falsifiable, say what hypothetical observation would disprove it. To help you answer some, search in wikipedia what are the Kant antinomies. Remember that falsifiable doesn't mean false.

   "The sun rises everyday"

   "The dog is either brown, or the dog is not brown."

   "All dogs are brown."

   "There's nothing you can do that can't be done. There's nothing you can sing that can't be sung" - The Beatles

   "The undecideds could go one way or another." - George H. W. Bush

   "All human actions are egotistic, motivated by self-interest"

   "There is no Spontaneity; everything in the world takes place solely in accordance with laws of nature." - Kant antinomy

   "There belongs to the world, either as its part or as its cause, a being that is absolutely necessary." - Kant antinomy

   "Spaniards are very spanish" - Spanish ex-president M.Rajoy

NAME:

2. Which of the following are fundamental quantities in physical science

    a) Time
    b) Velocity
    c) Length
    d) Weight
    e) Mass
    f) Heat
    g) Temperature

3. Rank the following lengths from shortest to longest: Diameter of Earth, Size of a grain of sand, Greatest ocean depth, Diameter of the Milky Way Galaxy, Distance from Earth to the nearest large galaxy (Andromeda), Diameter of a uranium nucleus, Diameter of a hydrogen atom, Wavelength of visible light, Diameter of a proton, Thickness of membranes in cell of living organism, Length of a football field, Distance from Earth to the sun, Height of a 4-year-old child, Distance traveled by light in 1 year, Distance from the Earth to the edges of the known universe, Distance from Earth to the sun.

4. Improve the following theory so that it has the least number of independent statements from which the rest can be derived. In other words, find the causal diagram relating the following events (draw arrows such that: cause → effect): rush hour, bad weather, traffic jam, accident, sirens.

Do the same for the following: Road conditions, average speed, danger level, number of fatalities, number of journeys, weather, season.

5. Imagine we are dropped from an airplane into a desert island with nothing more than a piece of cloth. If we wanted to design a system for measuring lengths to start organizing people for building a shelter, what could we choose as a pre-established unit of length? Think about two different possibilities and discuss the advantages and disadvantages of using either one.