

EVENT 1: FERMI QUESTIONS

OBJECTIVE: To estimate the order of magnitude of a quantity that is difficult or impossible to measure.

RULES:

- a. Each team will be provided with a list of ten Fermi Questions.
- b. Each team will have 30 minutes in which to answer the questions.
- c. Each team will submit a single set of answers.
- d. All answers must be recorded in order of magnitude format (i.e., 10^4 not 3×10^4 , 10^6 not 7×10^5).
- e. No devices (cell phones, tablets, smart watches, calculators, netbooks, computers, etc.) or preprinted references material shall be permitted to be used during the event.

COMPETITION AND SCORING:

Ten points will be awarded for each correct answer (correct order of magnitude). There will be 1 point off for each order of magnitude difference from the accepted order of magnitude. No answer will score less than zero.

Sample Fermi Questions:

How much land area (in square meters) is found on earth?

(Answers 10^{14})

How many revolutions will a 14-inch tire have to make during a crossing of the continental United State?

(Answer is 10^6)

How many liters of air does an adult inhale in a 24-hour day?

(Answer is 10^4)

How many square meters of turf (real or artificial) are there in a National Football League Stadium?

(Answer is 10^4)

An automobile travels 100,000 km before the tire tread wears out. What thickness of rubber wears off a tire each revolution of a wheel? Please express your answer in centimeters.

(Answer is 10^{-8})

Updates to the rules and Forum discussion / questions with answers are available by going to the NJAAPT website: njaapt.wildapricot.org (top menu, "Events" and "Forum"). It is the team's responsibility to periodically check in or inquire about changes and clarifications to the rules.