Inaugural University of Michigan
Science Olympiad Invitational Tournament

Fermi Questions
(EXAM)

Test length: 50 Minutes

Team number: _____

School name: _____

Student names: _____

- Only writing utensils allowed. No calculators/cheat sheets/etc.
- There are boxes provided for your answers. Write **_only_** your answers in the boxes. Failure to do so will result in a 3 point penalty for each box. You can use the rest of the test or scratch paper to do calculations.
- Questions are **_not_** organized by difficulty. If you don't know how to solve a question, skip it, or guess, or something.
- You can tear the test apart, but write your team number on top of all of your pages if you do so.

1. How many events are held in a typical Division C Science Olympiad competition?	1.
2. As of 2017, how many minutes of movie has Steven Spielberg directed?	2.
3. Assume that in a game of Rock-Paper-Scissors, the hands played by both participants are chosen completely randomly with an equal chance of choosing Rock, Paper, or Scissors. If the two choose the same hand, they do another round. What is the probability the two play the same hand exactly 72 times before finally declaring a winner? Note: a probability of ½ can be written as 0.5	3.
4. What is the pH of rain?	4.
5. What is the net worth of Apple, Inc., in Mexican pesos?	5.
6. How many standard packs of Bicycle playing cards would it take to completely cover Jupiter?	6.
7. What is the surface area of an iPhone 7, in hectares?	7.
8. How many human skin cells, laid end to end, would it take to reach from here to the Science Olympiad National Tournament in Fort Collins, Colorado?	8.
9. What is the overall product of the lengths of the first names of everyone who is taking Fermi at this competition? (For example, if Bob, Mary, and Joseph are the only ones competing in Fermi, the answer would be 3 x 4 x 6 = 72 $\Rightarrow$ 2) Please note that I will be using the names written on the front pages of these tests to calculate the answer to this question.	9.
10. 26^9	10.
11. How many full rolls of toilet paper could fit inside the White House?	11.
12. What is the mass of a mole (unit) of moles (animal), in ounces?	12.
13. What is the density of four-year colleges in the United States, per square meter?	13.

14. If the population of Michigan were to continue growing at its current growth rate for eternity, how many years from now would it take for its population to reach the current population of the world?	14.
15. What is the perimeter of Manhattan, in terms of the wavelength of red light?	15.
16. How many credit cards would fit in the Earth's stratosphere?	16.
17. A sample of pure iridium weighs as much as a loaf of bread. How many atoms of iridium are in the sample?	17.
18. At what speed would a standard brick have to travel in order to have the same kinetic energy as a Ping-Pong ball travelling at a cheetah's top speed? Give your answer in km/hr.	18.
19. What is the file size of the original Pokémon Red, in terms of the file size of the total article text of the English Wikipedia?	19.
20. On average, how many times has Luis Fonsi's *Despacito* been watched on YouTube per day since it was uploaded?	20.
21. What is the diameter of an electron, in light years?	21.
22. How many March Madness brackets would each member of the US Congress have to fill out in order to guarantee that someone has a perfect bracket? You can assume that each member of Congress fills out the same number of brackets and that all filled-out brackets are unique.	22.
23. If every person who ever lived crowded together in one spot, how much area would be covered, in terms of the area of Rhode Island?	23.
24. How many individual fries does McDonald's sell every year?	24.
25. How many pennies would it take to create a walkable bridge from Boston, MA to Portugal, assuming that pennies sink (and that you therefore must stack pennies from the bottom of the ocean floor)?	25.
26. How many more square centimeters is the area of the earth in the flat earth model, compared to the area of the earth in real life? Useful note: The most common flat earth model represents the earth as a disk, with the North Pole at the center and the "South Pole" at the edge.	26.
27. How many exa-newtons of force does the Earth's gravitational field apply on a single grain of rice located on the surface of the Moon?	27.
28. You are in space and are unaffected by gravity (yes you are still breathing, don't ask how). You want to get from the Sun to the next closest star, so you throw your shoe in the correct direction. How many minutes would it take for you to get there?	28.

29. How many times does the string "cell" appear in Campbell's Biology, 9th edition? (Note: any word that contains "cell", such as "intracellular" or "cellulose", would count)	29.
30. How many terabytes is this test, when converted to PDF format?	30.
31. How many standard AAA batteries would it take to equal the total installed wind energy capacity of the world?	31.
32. How many cells are in the typical human body?	32.
33. If you took the hair from the heads of every student enrolled at the University of Michigan, how many pounds of hair would you have?	33.
34. An average-sized blue whale is actually a mutant - it can stay suspended in pure helium without sinking or rising. What is its mass, in solar masses?	34.
35. How many results turn up when "University of Michigan Science Olympiad" is Googled?	35.
36. Estimate your score for the first 35 problems.	36.