

# Fermi Questions Tryout Test

Name: \_\_\_\_\_ Grade: \_\_\_\_\_ Score: \_\_\_\_\_

**Instructions:** A “Fermi Question” is a science related question that seeks a fast, rough estimate of a quantity, which is either difficult or impossible to measure directly. In the given time limit, answer as many questions as you can. You are not expected to finish the test.

- Calculators, computers, slide rules, reference sheets, etc., are not allowed.
- All answers must be expressed as integers with the integer being the exponent of the correct power of 10. For example, if the number is in the form  $C * 10^E$  the correct answer would be E. The guide for rounding C is as follows: if C is 5 or greater (to 9.99...), round C up to 10. If C is below 5 (and greater than 1), round C down to 1. For example, if the answer is  $4.99 \times 10^6$ , record your answer as 6. If the answer is  $5.0 \times 10^6$ , record your answer as 7. Responses marked as either  $4.99 \times 10^6$  or  $5.01 \times 10^6$  will be marked incorrect.
- Positive exponents are the default. For negative exponents, the minus (-) sign must be included in the answer. If the answer is  $4.99 \times 10^{-6}$ , the correct power of 10 is -6.
- The test will be scored as follows: if your answer is equal to the accepted value, you will earn 5 points, if it is  $\pm 1$  of the accepted value, you will earn 3 points. If it is  $\pm 2$  of the accepted value, you will earn 1 point for your answer.

Number	Question	Answer	Score
1.	How many hot dogs are eaten at a Boston Red Sox game?	4	5 3 1 0
2.	How many liters of water are there in Earth's oceans?	21	5 3 1 0
3.	How many electrons in a mole of neutral oxygen gas?	25	5 3 1 0
4.	How many rotations does a school bus tire make during a twenty-five-mile trip?	4	5 3 1 0
5.	How many pennies are in \$56,399.45	7	5 3 1 0

## Fermi Questions 2

6.	On Earth, how many millimeters long would the string on a simple pendulum have to be to have a period of one minute?	6	5	3	1	0
7.	What is the mass of the moon in grams?	26	5	3	1	0
8.	On average, how many hours of television commercials does a school student see during four years of high school?	3	5	3	1	0
9.	If the entire human population could fit on one scale, what would it read in ounces?	13	5	3	1	0
10.	How long in days does it take a quarter to fall 100 meters?	-5	5	3	1	0
11.	How many blades of grass are there on the playing area of a football field?	8	5	3	1	0
12.	How many tick marks are there on a meter stick (including both metric and empirical sides)	3	5	3	1	0
13.	How many Taco Bell burritos would it take to equal the price of an average college textbook?	2	5	3	1	0
14.	How many electrons would you need to balance the weight of J.J. Thompson?	32	5	3	1	0
15.	What is the wavelength of violet light in miles?	-10	5	3	1	0
16.	How many seconds is the average lifetime?	9	5	3	1	0
17.	How many Oxygen molecules are there in a cup of water?	26	5	3	1	0
18.	How many Joules of kinetic energy does a proton moving at 50% the speed of light have?	13	5	3	1	0
19.	What would be the mass in grams of an ice cube the size of a tractor trailer?	8	5	3	1	0
20.	How many words are in the Oxford English dictionary?	5	5	3	1	0

## Fermi Questions 3

21.	How many times would your heart beat during a six-month trip to Mars?	5	5	3	1	0
22.	How many bits of information can be stored on a standard CD-ROM?	10	5	3	1	0
23.	64!	89	5	3	1	0
24.	How many M&M candies would fit in a Prius	9	5	3	1	0
25.	What is the voltage necessary to move a single electron through a 670 $\Omega$ resistor?	-16	5	3	1	0
26.	How many electrons move through a 60W bulb in one hour?	22	5	3	1	0
27.	What would the weight in pounds be of a fifty-foot-tall woman?	5	5	3	1	0
28.	How many books are there in the library of congress?	7	5	3	1	0
29.	How many possible combinations are there for a standard 3x3 Rubik's cube?	19	5	3	1	0
30.	How many square millimeters are in a square mile?	12	5	3	1	0
31.	What number of US dollar coins would you have to lay on the surface area of the Earth in order to fully cover it?	17	5	3	1	0
32.	How many hairs are on a black bear?	6	5	3	1	0
33.	How long a line in millimeters will an average Bic pen write?	6	5	3	1	0
34.	How many letters are in a Campbell Biology textbook?	6	5	3	1	0
35.	$6^{457}$	355	5	3	1	0

## Fermi Questions 4

36.	How many inches per minute does light in a vacuum travel?	8	5	3	1	0
37.	How many golf balls would fit inside the sun?	31	5	3	1	0
38.	If you start with \$1000, how many dollars would you have in 1,000 years with an annual return of 3%	7	5	3	1	0
39.	How many grains of sugar are in a 50-pound bag of pure cane granulated sugar?	8	5	3	1	0
40.	How many water balloons can you make out of the Earth's entire ocean?	20	5	3	1	0
41.	How many pounds of rice will the average Japanese eat in their lifetime?	12	5	3	1	0
42.	How many miles of road are in the US interstate system?	4	5	3	1	0
43.	How many atoms are in the human body?	28	5	3	1	0
44.	How many US dollar bills would it take in order to create a stack from Stockholm to Beijing?	11	5	3	1	0
45.	How many Pascals would the air pressure be in a bubble one mile below the surface of the ocean?	7	5	3	1	0
46.	How many calories of energy is needed to evaporate the entire Atlantic Ocean?	17	5	3	1	0
47.	How many grains of sand are there in the top most layer of the Sahara Desert?	21	5	3	1	0
48.	What is the sum of all integers from one to one septillion, exclusive?	47	5	3	1	0
49.	How many gallons of diesel fuel would it take for a town of 2000 people to travel in school busses from Montana to Texas?	4	5	3	1	0
50.	How many questions are on this test?	2	5	3	1	0