Fermi Practice Test KEY

You will have fifty minutes for this exam. If your answer is X * 10^Y, write your answer as "Y". If the correct answer is Y, you get 5 points. If the correct answer happens to be Y ± 1, you get 3 points. If the correct answer happens to be Y ± 2, you get 1 point. Time will be used as a tiebreaker. Remember, no calculators or other resources are allowed. Good luck!

1. How many people live in Canada? **7**
34 million = 3.4 * 10^7
2. How many genes do humans have? **4**
20,000 – 30,000 genes = 2*10^4 – 3*10^4
3. What is the mass of the moon, in grams? **26**
7.3 * 10^22 kg * 1000g/kg = 7.3 * 10^25 g
4. 8^88? **79**
2.96 * 10^79
5. How many square millimeters are in a square mile? **12**
2.59 * 10^12 mm
6. If the entire human population could fit on one scale, what would it read, in ounces? **13**
~6.9 billion people * 70kg/person * 35.27oz/kg = 1.7*10^13 oz
7. How many aircraft-related deaths have occurred since the first flight? **7**
~2.7 million = 2.7 * 10^7
8. What is the density of Osmium, in kg/m^3? **4**
22590 kg/m^3 = 2.259 * 10^4 kg/m^3

9. $\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{1 \times 10^{1000}}}}}}$ **31**
1.7 * 10^31

10. How many inches is the distance from the Earth to Alpha Centauri? **18**
1.6 * 10^18 inches
11. How many individual potatoes did the state of Idaho produce in 2010? **10**
10 billion potatoes = 1*10^10 potatoes
12. Imagine that you win a lottery that gives you three cents every time you breathe. Assuming you won this the second you were born, how many dollars will you have accrued by the time of your death? **7**
.03 dollars * 15 breaths/min * 525600 min/year * 70 years = 1.6 * 10^7 dollars
13. How many acres of rainforest were destroyed in the time it took to take this test? **3**
1.5 acres/sec * 60 sec/min * 50 min = 4.5 * 10^3
14. How many dollar bills, stacked on top of each other, would it take to reach the height of Mt. Everest? **8**
~29,000 feet * 12inch/foot * 250 dollars/inch = 8.71 * 10^7

15. What is the 10th Mersenne Prime? **27**
6.18 * 10^26
16. How many words are in the King James version of the Bible? **6**
~800,000 words = 8.0 * 10^5
17. What is the chance that you will die of bovine spongiform encephalopathy? **-8**
1/40000000 = 2.5 * 10^-8
18. What is the chance of rolling snake eyes on a pair of two unweighted dice ten times in a row? **-16**
2.74 * 10^-16
19. What is the wavelength of violet light, in miles? **-10**
400nm in miles = 2.5 * 10^-10 miles
20. What is the mass of one electron, in kg? **-30**
9.1 * 10^-31 kg = ~1 * 10^-30 kg
21. How many elephants would it take to have a weight equal to the weight of the RMS Titanic before she sunk? **4**
10630 = 1.06 * 10^4
22. If every ocean completely evaporated on Earth and we collected all the salt left behind, how many salt licks could we make? **19**
9.9 * 10^19 kg/ 3kg = 3.3 * 10^19
23. What is the power of one horsepower applied for one second, in joules? **3**
7.5 * 10^2 J = ~1*10^3 J
24. (4^3^2^1)/ 15! ? **-7**
2 * 10^-7
25. How many medals were used at the Science Olympiad National competition this year? **3**
2 medals/team* 54 events * 6 chances/event + 20 team medals * 15 medals/team
26. How many molecules of oxygen are there in a single breath by a human? **21**
http://www.wolframalpha.com/input/?i=volume+of+human+breath%2F22.4+liters+*+6.02E23+*+.2095
27. How many pounds of rice will the average Filipino eat in their lifetime? **4**
http://www.wolframalpha.com/input/?i=rice+consumption+of+philippines+per+capita+*+70+years
28. How many Statues of Liberty, stacked vertically, could fit into the Marianas Trench?http://www.wolframalpha.com/input/?i=depth+marianas+trench%2F+height+of+statue+of+liberty **2**
29. How many square feet are there in a square parsec? **34**

30. A chain mail is sent out where a person has to send it out to five different people. It starts with two people, who each send it to five friends – each friend then sends it to five other people. Assuming that it takes about a day for each person to respond, how many seconds would it take for the entire human population to receive the chain mail? Take between 4-5 days, 8.6E4 seconds/day → **5**

31. How many pounds of fuel have Yankton Middle School, the representative from South Dakota, used since 1988 for their trips to national competitions? (Note – Yankton has never lost their state competition). Threw this question out – Yankton didn't answer my e-mail :P
32. In the time that it took me to write this test, how many miles did light travel? **12**