

Examples: If your estimate is 550 or above, then you should enter "3".

If your estimate is less than 550, then you should enter "2".

If your estimate is 450, then you should enter "2" because 450 is closer to  $10^2$  than to  $10^3$ .

## *Fermi Questions*

- 1.) How long (in meters) are all human beings that ever lived when laid in one long line head to toe?  
(A) 7      (B) 10      (C) 13      (D) 15      (E) 18
  
- 2.) By how many millimeters would the ocean level raise if all living humans jumped into it?  
(A) -8      (B) -5      (C) -3      (D) 0      (E) 3
  
- 3.) How many ordinary helium balloons does it take to lift the average human?  
(A) 2      (B) 4      (C) 6      (D) 8      (E) 10
  
- 4.) How many molecules of Einstein's last breath did you just inhale?  
(A) 0      (B) 2      (C) 4      (D) 6      (E) 8
  
- 5.) Researchers say that in 11 months of 2002 an ice shelf the area of Rhode Island separated from Antarctica. If it were 220 meters thick how many 20 lb ice bags would it fill?  
(A) 7      (B) 9      (C) 11      (D) 13      (E) 15
  
- 6.) A parsec is a length that is the radius of an arc formed by the earth to sun distance subtended by one second angle. What is a parsec in meters?  
(A) 14      (B) 15      (C) 16      (D) 17      (E) 18

- 7.) If you built a highway from here to the moon, how many gallons would be needed to paint the yellow line down the middle?  
(A) 2 (B) 4 (C) 6 (D) 8 (E) 10
- 8.) How many cubic centimeters would be occupied by the nuclei of all the atoms in the lead (graphite) in a new pencil?  
(A) -13 (B) -11 (C) -9 (D) -7 (E) -5
- 9.) What is the mass of a single red blood cell in grams?  
(A) -19 (B) -17 (C) -15 (D) -13 (E) -11
- 10.) How many atoms are there in a snowflake?  
(A) 20 (B) 22 (C) 24 (D) 26 (E) 28
- 11.) If you made and cooked a piece of spaghetti long enough to reach from Yale to Berkeley, how big a bowl (in liters) would you need to serve it in?  
(A) 2 (B) 4 (C) 6 (D) 8 (E) 10
- 12.) By how many degrees (in Celsius) would a human heat 50000 liters of water if he would use all energy available in his meals in one year of his life?  
(A) -2 (B) -1 (C) 0 (D) 1 (E) 2
- 13.) If you would accelerate for one week a person starting at rest with the gravitational acceleration what speed would this person reach (in m/s)?  
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7
- 14.) What is the ratio of astronaut's weight on the Moon to his weight on the Earth?  
(A) -4 (B) -3 (C) -2 (D) -1 (E) 0
- 15.) An air bubble created at the bottom of the lake rises. When it reaches the lake level its volume is increased by a factor of three. How deep is the lake (in meters)?  
(A) -1 (B) 0 (C) 1 (D) 2 (E) 3