1. The journey from Singapore to New York, USA is 15339 km long.
   a) Express this distance in terms of metres using scientific notation in 3 significant figures.
   b) Express this distance using other SI prefixes. (More than one possible answer).

2. How many metres are there in
   4.11 nm?
   3.24 μm?
   73.2 Gm?
   Express your answer using scientific notation.

3. For a cube of side 3.2 cm, what is its volume in m^3?

4. The density of lead is 11.3 g/cm^3. What is this value in kg/m^3?

5. How many years older will you be in 1.00 billion seconds from now? Assume a 365 day year.

6. In the fall of 2002, a group of scientists at Los Alamos National Laboratory determined the critical mass of neptunium is about 60 kg. The fissionable material is the minimum amount that must be brought together to start a chain reaction. This element has a density of 19.5 g/cm^3. What would be the radius of a sphere of this material that has a critical mass?

7. The gravitational force between two planets of mass m_1 and m_2 separated by a distance of r is given by $F = G\frac{m_1 m_2}{r^2}$. What is the SI unit of G?

8. Show that the quantity C in the following formula is dimensionless: $C = \frac{F}{\rho v^2 A}$.
   The symbols represent: F – force, ρ – mass density, v – speed, A – area.

9. The force F on an object of mass m moving in a circle of radius r with a speed v has the following formula: $F = m^x v^y r^z$. By matching units on both sides, determine the values of x, y and z.

10. The number of passengers that passed through an airport during a certain year was 37203978. Express this value to 3 significant figures.

11. What is the product of 5.3×10^6 and 8.861×10^{-6}?

12. What is 5.3×10^6 minus 8.861×10^{-6}?

13. What is 1.96×10^{-4} plus 7.561×10^{-5}?

Answers

1. a) 1.53×10^{7} m, b) one possible answer is 15.3 Mm.
2. a) 4.11×10^{-9} m, 3.24×10^{-6} m, 7.32×10^{10} m
3. 3.3×10^{-5} m^3
4. 1.13×10^{4} kg/m^3
5. 31.7 years older
6. 9.0 cm
7. $m^3/kg\ s^2$
9. $x = 1$, $y = 2$, $z = -1$
10. 3.72×10^{7}
11. 47
12. 5.3×10^{6}
13. 2.72×10^{-4}