Assignment 1

1. How long does it take light to travel from the Sun to the Earth? Give your answer in minutes and in seconds.

2. What is the speed in m/sec and km/hr of the Earth as it orbits the sun?

3. How long in seconds and in years would it take an astronaut to travel to the nearest star located 3 light years away if her average velocity is 10 km/sec?

4. Assuming that the sun is mostly made of hydrogen, how many hydrogen atoms are in it?

5. Estimate the number of atoms contained in the human body.

6. Evaluate the following without a calculator.
   a) $\sin(-15^\circ)$
   b) $\tan(135^\circ)$
   c) $\csc(240^\circ)$
   d) $\cos 4\pi/3$
   e) $\sec 5\pi/4$
   f) $\cot 3\pi/2$

7. a) Plot the following functions.
      i) $y = \cos\theta$
      ii) $y = 2\cos\theta$
      iii) $y = \cos(\theta + \pi/3)$
      iv) $y = \cos 2\theta$.
   b) What are the period and amplitude of $y = A\cos k\theta$?

8. An isosceles triangle has a long side equaling a length of 3 units and one angle equal 125°. Find the length of the two short sides.

9. A 2 meter long bar lies in the xy plane with one end at the origin. Find the position in the xy plane of the other end point of the bar if the angle the bar makes with the x axis is the following.
   a) 30°
   b) 120°
   c) $2\pi/3$
   d) $5\pi/6$

10. Find the first 5 terms of the Taylor's expansion for:
    a) $y = \cos\theta$
    b) $y = \tan\theta$.