Math 317 Homework Problems

1) Use the Bisection method for $\epsilon = 10^{-4}$ find the approximate value of $\sqrt{2}$.

2) Consider the function $f(x) = -x + \sin\left(\frac{\pi}{2} - x\right)$ on the interval $\left[0, \frac{\pi}{2}\right]$.
   a) Approximate a root of f using a fixed point method by giving a table of p_n for $n = 0,1, \ldots, 7$.
   b) Approximate a root of f usig Newton's method by giving a table of p_n for $n = 0,1, \ldots, 4$.

3) a) Determine the linear Lagrange interpolation polynomial that passes through the points $(-1, 2)$ and $(4, 1)$.
   b) Use $x_0 = 1,\ x_1 = 1.5,\ x_2 = 2$ to find the second interpolating polynomial to $f(x) = \frac{3}{2x+1}$.

4) Use the following table

x_k	0	1	2	3
$f(x_k)$	3	7	11	20

to find the Newton's interoplation polynomial.