Programming assignment:

Find an approximation to $\sqrt{2}$ that is accurate to within 10-4.

a) Use Bisection method
b) Use Secant/Regula falsi method
c) Use Fixed point method
d) Use following iteration formula:

$$x_{n+1} = x_n - \frac{f(x_n)}{g(x_n)}$$

where

$$g(x_n) = \frac{f\big(x_n + f(x_n)\big) - f(x_n)}{f(x_n)}$$

e) Use Newton Method

Compare each method and describe which one converges fast?