

Question 1: Find the root of $f(x) = (x - 4)^2(x + 2) = 0$ taking the range (-2.5,1) using

- 3 iteration bisection method
- 3 iteration false position method
- Find the relative error in the last iteration for a and b

$$f(x) = (x - 4)^2(x + 2) = 0$$

a)- bisection

x_l	x_u	x_r	$f(x_l)$	$f(x_r)$
-2.5	1	-0.75	-21.125	28.20313
-2.5	-0.75	-1.625	-21.125	11.86523
-2.5	-1.625	-2.0625	-21.125	-2.29712

b)- false position

x_l	x_r	x_u	$f(x_l)$	$f(x_r)$	$f(x_u)$
-2.5	-0.96364	1	-21.125	25.5336	27
-2.5	-1.8044	-0.96364	-21.125	6.589943	25.5336
-2.5	-1.9698	-1.8044	-21.125	1.07637	6.589943

c)-

bisection	$e_a =$	0.212121
false position	$e_a =$	0.083966

Question 2: Use newton raphson method to find the root of $f(x) = e^x \cos(x)$ start with $x = -1.4$ and approximate the root with an absolute error less than 0.02

$$f(x) = e^x \cos(x)$$

$$\bar{f}(x) = e^x \cos(x) - e^x \sin(x)$$

iter	x_i	$f(x_i)$	$f'(x_i)$	x_{i+1}	ϵ_a
1	-1.4	0.041913	0.284922	-1.5471	
2	-1.5471	0.005043	0.217846	1.57025	0.095084
3	1.57025	0.000113	0.208106	-1.5708	0.014741
4	-1.5708	6.15E-08	0.20788	-1.5708	0.000346

Question 3: chose the correct answer

- 1- If $x_4=35.21$ and $x_5=35.19$ then x_5 is correct for _____ significant digit
- a. b. 3 c. 4 d. 5

2- Consider the following system of linear equations

$$\begin{bmatrix} 4 & 2 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$$

Start with $x=1$ and $y=1$ and find values of x and y after two Gauss-seidel iterations:

- a. $X=0$, $y=2.5$
- c. $X=-1$, $y=2.5$ d. $X=-0.6$, $y=2.2$

Consider the following matrices to answer part 3 and 4.

$$[A] = \begin{bmatrix} 1 & 2 & 0 & -3 \\ 2 & 1 & 3 & 1 \\ -2 & 1 & 1 & 3 \\ 0 & 2 & 2 & 1 \end{bmatrix} \quad [B] = \begin{bmatrix} 5 & 5 & 7 & -11 \\ 4 & 3.5 & 5.5 & -8 \\ b_{31} & -5.5 & -8.5 & 13 \\ 4 & 4 & 6 & -9 \end{bmatrix}$$

3- if $[C]=[A][B]$ then $C_{42} =$

- a). -11 b). 7 d). 2

4- If $[A]=[B]^{-1}$ then $b_{31} =$

- b). 5 c). 6 d). -5