Yağız AYKUT 02220224078

1/

$f(2) = 8-8-5 = -5$ $f(4) = 64-16-5 = 43$

$f(2)\cdot f(4) < 0$ (kök bu iki noktanın arasında olmalı)

$x_1 = 2$ $x_2 = 4$ $x_3 = 3$

1) $f(2) = -5$. $f(3) = 27-18-5 = 4$

$f(2)\cdot f(3) < 0$

2) $f(3) = 4$

$f(2,5) = 15,625 - 12,5 - 5 = -1,875$

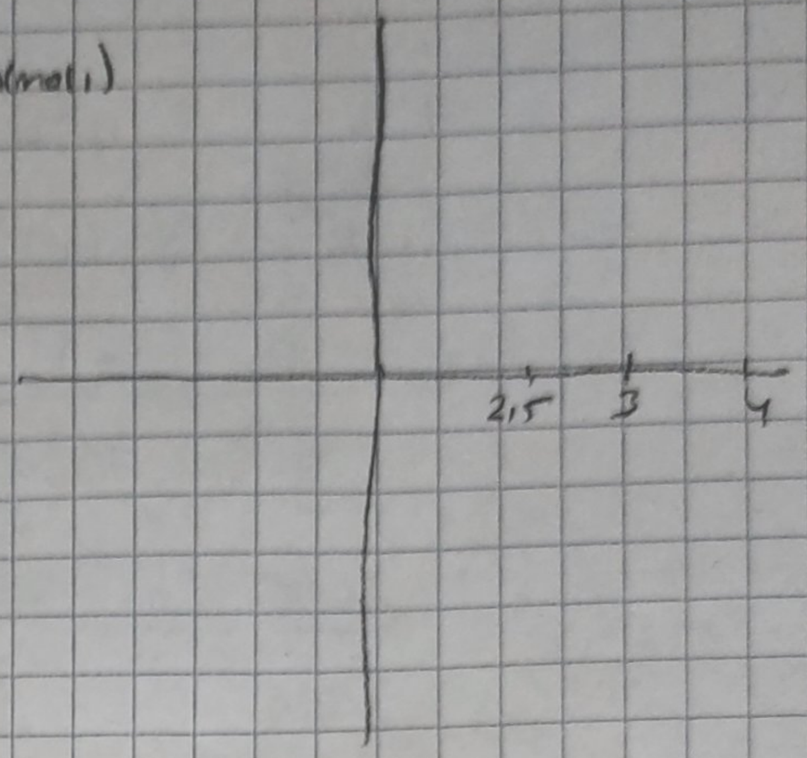
$f(3)\cdot f(2,5) < 0$

3) $f(2,75) = 20,796875 - 15,125 - 5 = 0,546$

$f(2,5) = -1,875$ $f(2,75)\cdot f(2,5) < 0$

4) $f(2,625) = 18,087 - 12,781 - 5 = -0,694$

$f(2,75) = 0,546$ $f(2,625)\cdot f(2,75) < 0$



2/

$x^3 + 4x^2 - 10$ $[1, 2]$ 4 iterasyon

$f(1) = 1+4-10 = -5$ $f(2) = 8+16-10 = 14$

1) $f(1,5) = 3,375 + 9 - 10 = 2,375$

$f(1,1) = -5$

$f(1,5)\cdot f(1) < 0$

2) $f(1,25) = 1,953 + 6,25 - 10 = -1,797$ $f(1,5) = 2,375$

$f(1,25)\cdot f(1,5) < 0$

3) $f(1,375) = 2,599 + 7,562 - 10 = 0,161$ $f(1,25) = 1,797$ $f(1,375)\cdot f(1,25) < 0$

4) $f(1,3125) = 2,260 + 6,890 - 10 = -0,85$ $f(1,375) = 0,161$

$f(1,3125)\cdot f(1,375) < 0$ $1,3125 + 0,03125 = 1,34375$

Yağız AYKUT 022202260 58

3/

$f(x) = x^{1/3}$ $f'(x) = \frac{1}{3} x^{-2/3}$

$x_0 = 1$ $f(1) = 1$ $f'(1) = 3$ $x_1 = 1 - 1/3 = 2/3$ $f(1) = 3$

$x_2 = 2/3 - (2/3)^{1/3} \approx 0,7937$

$x_3 = 0,7937 - \frac{(0,7937)^{1/3}}{\frac{1}{3}(0,7937)^{-2/3}} \approx 0,6819$

Son iterasyon doğrusal fonksiyon olduğundan kökten uzaklaşır. Bu metod kullanılmaz.

$x_4 = 0,6819 - \frac{(0,6819)^{1/3}}{1/3(0,6819)^{-2/3}} \approx 0,6932$

$x_5 = 0,6932 - \frac{0,8799}{0,6345} \approx 0,8472$

4/

$f(x) = 4e^{-0,5x} - x$ $f'(x) = (4 \cdot (-0,5x) \cdot e^{-0,5x-1}) - 1$

$= 2 \cdot e^{-0,5x} - 1$

$x_0 = 2$

$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$ $x_1 = 2 - \frac{4e^{0,5 \cdot 2} - 2}{-2e^{-0,5} - 1}$

$x_1 \approx 1,695$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$

$x_2 \approx 1,705$

$x_2 = 1,705$ $x_3 = x_2 - \frac{f(x_2)}{f'(x_2)}$

$x_3 \approx 1,705211$

$x_4 = x_3 - \frac{f(x_3)}{f'(x_3)}$

$x_4 \approx 1,705221$ x_2 başlangıç değeriyle yapılan 4 iterasyonda fonksiyonun kökü yaklaşık olarak 1,7052 dir

Scanned by TapScanner