

Section 2.3 Exercise 4)

a)

$$p_2 = p_1 - \frac{f(p_1)(p_1 - p_0)}{f(p_1) - f(p_0)} = 0 - \frac{f(0)}{f(0) - f(-1)} = \frac{-\cos(0)}{-\cos(0) - (-(-1)^3 - \cos(-1))} = -0.6851$$

$$p_3 = p_2 - \frac{f(p_2)(p_2 - p_1)}{f(p_2) - f(p_1)} = -0.6851 - \frac{f(-0.6851)(-0.6851 - 0)}{f(-0.6851) - f(0)} \approx -1.252$$

b)

a şıkkından faydalanırsak,

$$p_3 = p_2 - \frac{f(p_2)(p_2 - p_0)}{f(p_2) - f(p_0)} = \frac{1}{\cos(-1) - 2} - \frac{\left(\frac{1}{(\cos(-1) - 2)^3} - \cos\left(\frac{1}{\cos(-1) - 2}\right)\right) \left(\frac{1}{\cos(-1) - 2}\right)}{\frac{1}{(\cos(-1) - 2)^3} - \cos\left(\frac{1}{(\cos(-1) - 2)^3}\right) - (1 - \cos(-1))}$$

$$p_3 \approx -0.841355$$

Section 2.3 Exercise 5)

a)

$$f(x) = x^3 - 2x^2 - 5 = 0$$

$$f'(x) = 3x^2 - 4$$

$$p \approx 2.69065$$

$$p_0 = 2$$

$$p_{n+1} = p_n - \frac{f(p_n)}{f'(p_n)}$$

$$p_1 = 2 - \frac{2^3 - 2 \cdot 2^2 - 5}{3 \cdot 2^2 - 4 \cdot 2} = 3.25$$

$$p_2 = 3.25 - \frac{(3.25)^3 - 2 \cdot (3.25)^2 - 5}{3 \cdot (3.25)^2 - 4 \cdot (3.25)} = 2.811036789$$

$$p_3 = p_2 - \frac{p_2^3 - 2 \cdot p_2^2 - 5}{3 \cdot p_2^2 - 4 \cdot p_2} = 2.697989502$$

$$p_4 = 2.690677153$$

4 iterasyonun ardından $|p_4 - p| < 10^{-4}$ sonucuna ulaştık.