1. $x^3 + 3.8x^2 - 8.6x - 24.4 = 0$

(a) Newton's method

$f(x) = x^3 + 3.8x^2 - 8.6x - 24.4$; $\quad f'(x) = 3x^2 + 7.6x - 8.6$

$x_{i+1} = x_i - \dfrac{f(x_i)}{f'(x_i)} = x_i - \dfrac{x_i^3 + 3.8x_i^2 - 8.6x_i - 24.4}{3x_i^2 + 7.6x_i - 8.6}$

$i=1$ $\quad x_1 = 2$ $\qquad x_2 = 2 - \dfrac{2^3 + 3.8 \cdot 2^2 - 8.6 \cdot 2 - 24.4}{3 \cdot 2^2 + 7.6 \cdot 2 - 8.6} = 2.9892$

$i=2$ $\quad x_2 = 2.9892$ $\quad x_3 = 2.9892 - \dfrac{2.9892^3 + 3.8 \cdot 2.9892^2 - 8.6 \cdot 2.9892 - 24.4}{3 \cdot 2.9892^2 + 7.6 \cdot 2.9892 - 8.6} =$

$x_3 = 2.7312$

$i=3$ $\quad x_3 = 2.7312$ $\quad x_4 = 2.7312 - \dfrac{2.7312^3 + 3.8 \cdot 2.7312^2 - 8.6 \cdot 2.7312 - 24.4}{3 \cdot 2.7312^2 + 7.6 \cdot 2.7312 - 8.6} =$

$x_4 = 2.7071$

$i=4$ $\quad x_4 = 2.7071$ $\quad x_5 = 2.7071 - \dfrac{2.7071^3 + 3.8 \cdot 2.7071^2 - 8.6 \cdot 2.7071 - 24.4}{3 \cdot 2.7071^2 + 7.6 \cdot 2.7071 - 8.6} =$

$x_5 = 2.7069$

$i=5$ $\quad x_5 = 2.7069$ $\qquad x_6 = 2.7069 - \dfrac{2.7069^3 + 3.8 \cdot 2.7069^2 - 8.6 \cdot 2.7069 - 24.4}{3 \cdot 2.7069^2 + 7.6 \cdot 2.7069 - 8.6}$

$x_6 = 2.7069$

(b) Secant method

$f(x) = x^3 + 3.8x^2 - 8.6x - 24.4$ $\qquad x_{i+1} = x_i - \dfrac{f(x_i)(x_{i-1} - x_i)}{f(x_{i-1}) - f(x_i)}$

$x_1 = 2$ $\quad x_2 = 3$ $\quad f(x_1) = 2^3 + 3.8 \cdot 2^2 - 8.6 \cdot 2 - 24.4 = -18.4$

$f(x_2) = 3^3 + 3.8 \cdot 3^2 - 8.6 \cdot 3 - 24.4 = 11$

$i=2$ $\quad x_3 = 3 - \dfrac{11(2-3)}{(-18.4) - 11} = 2.6259$ $\quad f(x_3) = 2.6259^3 + 3.8 \cdot 2.6259^2 +$
$\qquad\qquad - 8.6 \cdot 2.6259 - 24.4 = -2.6739$

$i=3$ $\quad x_4 = 2.6259 - \dfrac{(-2.6739)(3 - 2.6259)}{11 - (-2.6739)} = 2.6991$

$\qquad f(x_4) = 2.6991^3 + 3.8 \cdot 2.6991^2 - 8.6 \cdot 2.6991 - 24.4 = -0.2654$

$i=4$ $\quad x_5 = 2.6991 - \dfrac{(-0.2654)(2.6259 - 2.6991)}{-2.6739 - (-0.2654)} = 2.7072$

$$f(x_5) = 2,7072^3 + 3,6 \cdot 2,7072^2 - 8,6 \cdot 2,7072 - 24,4 = 0,0089053$$

$$i = 5 \quad x_6 = 2,7072 - \frac{(0,0089053)(2,6991 - 2,7074)}{-0,8654 - 0,0089053} = 2,7069$$