Zad. 5

$$x_{n+1} = x_n - \frac{f(x_n) f'(x_n)}{(f'(x_n))^2 - \left(\frac{f(x_n) f''(x_n)}{2}\right)}$$

Z definicji $g(x) = \frac{f(x)}{\sqrt{f'(x)}}$

więc:

$$g'(x) = \frac{d}{dx}\left(\frac{f(x)}{\sqrt{f'(x)}}\right) = \frac{f'(x)\sqrt{f'(x)} - \frac{f(x) \cdot f''(x)}{2\sqrt{f'(x)}}}{f'(x)}$$

$$* \quad \frac{g(x)}{g'(x)} = \frac{f(x)}{\sqrt{f'(x)}} \cdot \frac{f'(x)}{f'(x)\sqrt{f'(x)} - \frac{f(x) \cdot f''(x)}{2\sqrt{f'(x)}}} = \frac{f(x) \cdot f'(x)}{(f'(x))^2 - \frac{f(x) f''(x)}{2}}$$

Z $*$

$$x_{n+1} = x_n - \frac{f(x_n) f'(x_n)}{f'(x_n)^2 - \frac{f(x_n) f''(x_n)}{2}}$$

$$\Updownarrow$$

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

metoda Newtona dla $g(x) = \frac{f(x)}{\sqrt{f'(x)}}$

Zad. 1 $p(z) = \sum_{i=0}^{n} x^i a_i$

- $p(z_0) = b_0$ gdzie $b_i = \begin{cases} a_i & , i=n \\ a_i + b_{i+1} x & , i \neq n \end{cases}$

$p_n(z) = \underbrace{(x - \underset{z_0}{t}) \sum_{i=0}^{n-1} b_{i+1} x^i}_{p_{n-1}(z)} + b_0$

- $p(z) = (z-z_0)^{4} p_{n-4}(z) + d_2 (z - z_0)^2 + c_1 (z - z_0) + b_0 + e_3 (x-t^3)$

$p_n'(z) = [(z-z_0)^2 p_{n-2}(z)]' + c_1 + 0$

$p_n'(z_0) = 0 + \emptyset + c_1 = c_1$

b, c, d, e wyrazy kolejnych schematu Hornera.

$p''(z_0) = 0 + 0 + 2 d_2 + 0 + 0 = 2 d_2$

$p'''(z_0) = 0 + 6 e_3 + 0 + 0 + 0 = 6 e_3$