Taylorův polynom 3. stupně

$$f(x) = x^2 - \sqrt{2-x} \qquad a = 1$$

I) $f(1) = 1 - \sqrt{2-1} = 1 - 1 = \underline{\underline{0}}$

$A = [1;0]$

II) $f'(x) = 2x - \frac{1}{2\sqrt{2-x}} \cdot (-1) = 2x + \frac{1}{2\sqrt{2-x}}$

$f'(1) = 2 + \frac{1}{2 \cdot \sqrt{1}} = 2 + \frac{1}{2} = \frac{4+1}{2} = \frac{5}{2}$

III) $f''(x) = 2 + \frac{-(2 \cdot \frac{1}{2\sqrt{2-x}} \cdot (-1))}{4(2-x)} = 2 + \frac{\frac{1}{\sqrt{2-x}}}{4(2-x)} = 2 + \frac{1}{\sqrt{2-x}} \cdot \frac{1}{4(2-x)} =$

$f''(1) = 2 + \frac{1}{\sqrt{2-1}} \cdot \frac{1}{4 \cdot (2-1)} = 2 + \frac{1}{1} \cdot \frac{1}{4} = 2 + \frac{1}{4} = \frac{8+1}{4} = \frac{9}{4}$

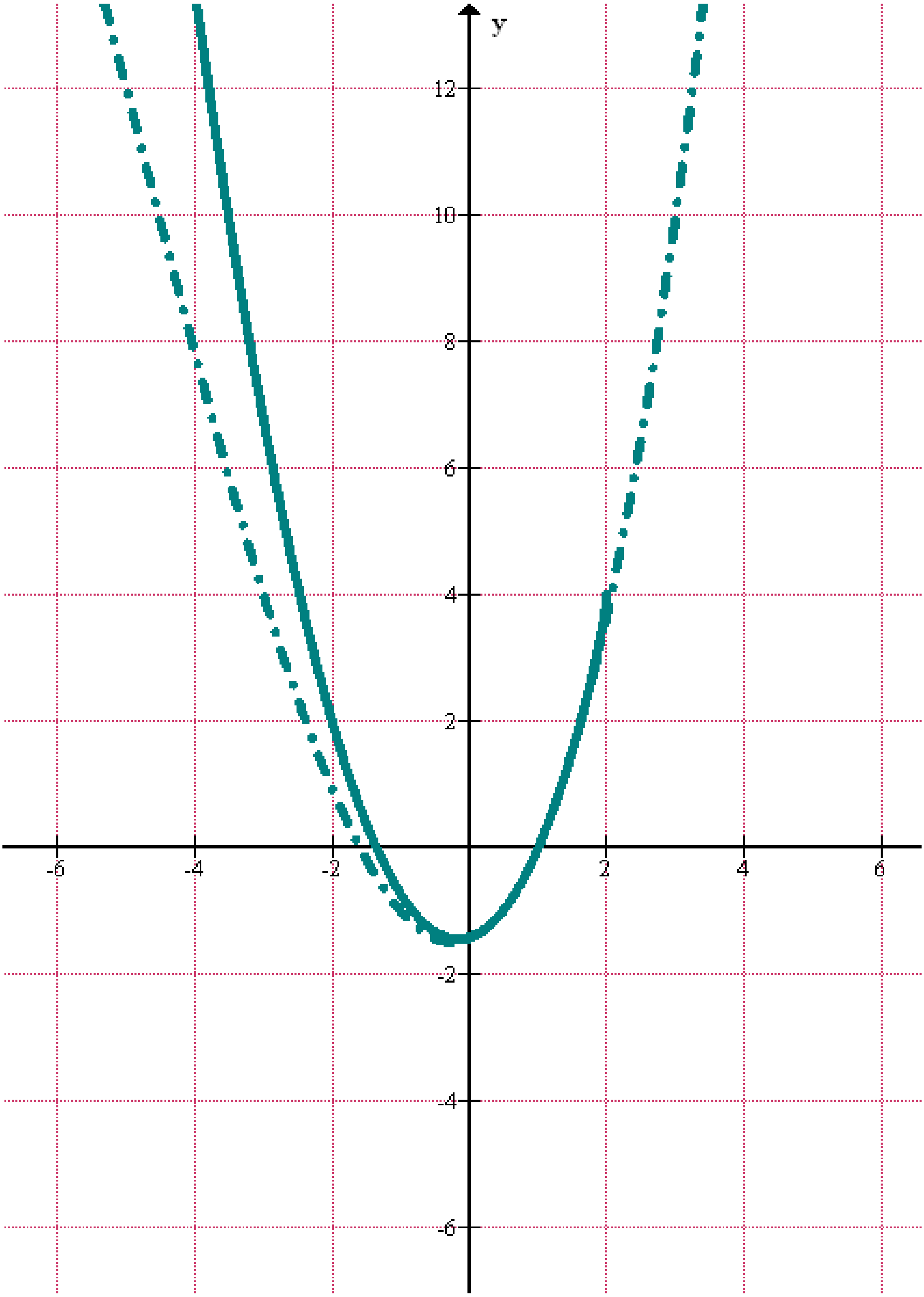
IV) $f'''(x) = \frac{1}{4} \cdot \frac{3}{2} \cdot (2-x)^{\frac{1}{2}} = \frac{3}{8} \cdot \sqrt{2-x}$

$f'''(1) = \frac{3}{8} \cdot \sqrt{1} = \frac{3}{8}$

$T_3: \ 0 + \frac{\frac{5}{2}}{1!}(x-1)^1 + \frac{\frac{9}{4}}{2!}(x-1)^2 + \frac{\frac{3}{8}}{3!}(x-1)^3$

$$= \underline{\underline{\frac{5}{2}(x-1) + \frac{9}{8}(x-1)^2 + \frac{1}{16}(x-1)^3}}$$

Obrázek 1. Grafické znázornění funkce a jejího Taylorova polynomu 3. stupně



Zdroj: program Graph