Taylorův polynom 3. stupně

$$f(x) = x^2 - x + 2e^{2x+1} \qquad x = -\frac{1}{2}$$

I) $f\left(-\frac{1}{2}\right) = \frac{1}{4} + \frac{1}{2} + 2e^{-2\frac{1}{2}+1} = \frac{1+2}{4} + 2e^{0} = \frac{3+8}{4} = \frac{11}{4}$

II) $f'(x) = 2x - 1 + 2e^{2x+1} \cdot 2 = \underline{\underline{2x + 4e^{2x+1} - 1}}$

$f'\left(-\frac{1}{2}\right) = -2 \cdot \frac{1}{2} + 4e^{2\cdot\left(-\frac{1}{2}\right)+1} - 1 = -1 + 4e^{-1+1} - 1 = -1 + 4 - 1 = \underline{\underline{2}}$

III) $f''(x) = 2 + 4e^{2x+1} \cdot 2 = \underline{\underline{2 + 8e^{2x+1}}}$

$f''\left(-\frac{1}{2}\right) = 2 + 8e^{0} = \underline{\underline{10}}$

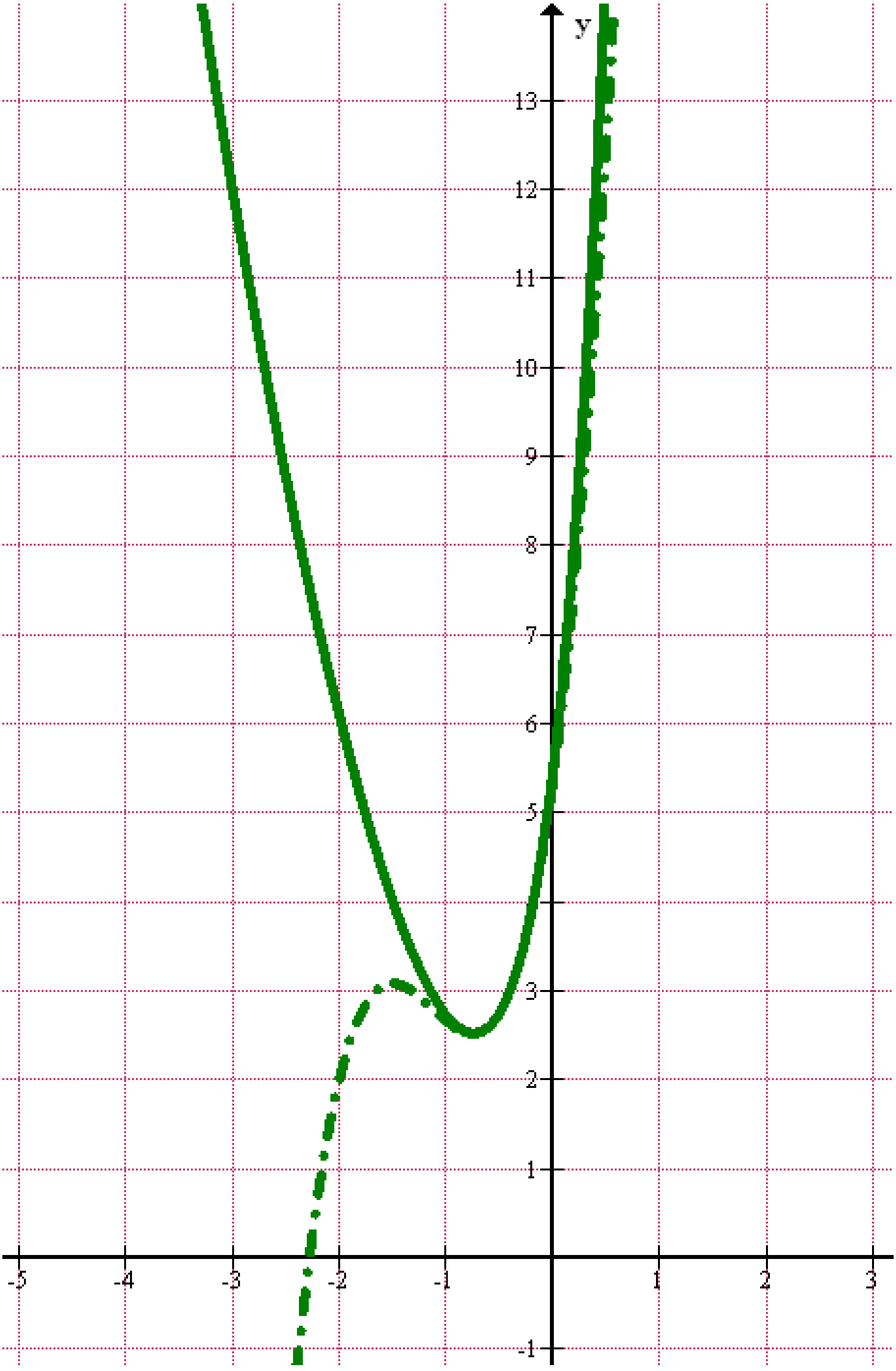
IV) $f'''(x) = 8e^{2x+1} \cdot 2 = \underline{\underline{16e^{2x+1}}}$

$f'''\left(-\frac{1}{2}\right) = 16e^{0} = \underline{\underline{16}}$

$$T_3: \frac{11}{4} + \frac{2}{1!}\left(x+\frac{1}{2}\right)^1 + \frac{10}{2!}\left(x+\frac{1}{2}\right)^2 + \frac{16}{3!}\left(x+\frac{1}{2}\right)^3$$

$$\underline{\underline{\frac{11}{4} + 2\left(x+\frac{1}{2}\right) + 5\left(x+\frac{1}{2}\right)^2 + \frac{8}{3}\left(x+\frac{1}{2}\right)^3}}$$

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



Zdroj: program Graph