Parc. zlomky 2

$$\int \frac{x^4+4x^3+9x^2+11x+4}{(x+3)(x^2+2x+2)^2}\,dx = \int \frac{A\ 1}{x+3} + \frac{Bx+C\ \ 0x+0}{x^2+2x+2} + \frac{Dx+E\ \ 1x+0}{(x^2+2x+2)^2}\,dx$$

- st $P$ < st $Q$ ✓
  $4 < 5$
- ( ) ✓
- $\int \frac{1}{x+3}\,dx \overset{c}{=} \ln|x+3|$

$$\int \frac{x}{(x^2+2x+2)^2}\,dx = \int \frac{1}{2}\cdot\frac{2x+2}{(x^2+2x+2)^2}\,dx + \int \frac{1}{2}\cdot\frac{-2}{(x^2+2x+2)^2}\,dx$$ ✓

$$\frac{2x+2}{(x^2+2x+2)^2}$$

$y = x^2+2x+2$

$dy = 2x+2\ dx$

$$\rightarrow \int \frac{1}{2}\frac{1}{y^2}\,dy \overset{c}{=} \frac{1}{2}\frac{-1}{y} = \frac{-1}{2(x^2+2x+2)}$$

$$-\int \frac{1}{(x^2+2x+2)^2}\,dx = -\int \frac{1}{[(x+1)^2+1]^2}\,dx$$

$z = x+1$

$dz = 1\,dx$

$$= -\underbrace{\int \frac{1}{(z^2+1)^2}\,dz}_{I_2 = I_{1+1}} = -\frac{z}{2\cdot 1(1+z^2)^1} + -\frac{2\cdot 1-1}{2\cdot 1} I_1$$

$I_1$: arctan z

$$\overset{c}{=} \frac{-z}{2(1+z^2)} - \frac{1}{2}\arctan z =$$

$$= \frac{-(x+1)}{2(1+(x+1)^2)} - \frac{1}{2}\arctan(x+1)$$

$x \neq 3$

$$\text{Záver} \overset{c}{=} \ln|x+3| + \frac{-1}{2(x^2+2x+2)} + \frac{-1}{2(x^2+2x+2)} + \frac{-1}{2}\arctan(x+1)$$

$$\int \frac{1}{(1+x^2)^2}\,dx = \int \frac{1}{(1+tg^2 t)^2} \cdot \frac{1}{\cos^2 t}\,dt =$$

$x = tg\, t$ $\qquad$ $\downarrow$ $\qquad$ $t = \arctan x$

$dx = \frac{1}{\cos^2 t}\,dt$ $\qquad$ $\frac{1}{\cos^2 t}$

$\neq 0$

$$= \int \cos^4 t \cdot \frac{1}{\cos^2 t}\,dt = \int \cos^2 t\,dt =$$

$$= \int \frac{1+\cos 2t}{2}\,dt \overset{c}{=} \frac{t}{2} + \frac{1}{2}\,\frac{\sin 2t}{2}$$

$$= \frac{t}{2} + \frac{1}{2}\sin t \cos t = \frac{1}{2}\arctan x + \frac{1}{2}\,\frac{x}{1+x^2}$$

$x \in \mathbb{R}$ $\qquad$ $x \in (a,b) \rightarrow$

2. Vosubst.

$\varphi(t) = tg\, t$ $\qquad$ $(\alpha,\beta) = (-\frac{\pi}{2}, \frac{\pi}{2})$

$\varphi(-\frac{\pi}{2}, \frac{\pi}{2}) = \mathbb{R} = (a,b)$