$$-\int 2x\sqrt{x^2-a}\,dx = \int \sqrt{y}\,dy \overset{c}{=} \frac{2}{3}y^{3/2} = \frac{2}{3}(x^2-a)^{3/2}$$

$x \in (3,\infty)$ ⟶ $y = x^2 - a$ $\quad \varphi$ $\quad (\alpha,\beta) = (3,\infty)$

$x \in (-\infty,-3)$ $\quad dy = 2x\,dx$ $\quad \downarrow$ $\quad (a,b)$ ✓

$x \in (-\infty,-3)$

(α,β)

$t = -x \leftarrow \varphi$

" $-t = x$ "

$dt = -1\,dx$

$\varphi(-\infty,-3) = (3,\infty)$

$$-\int -2t\sqrt{(-t)^2-a}\,dt =$$

$$\int 2t\sqrt{t^2-a}\,dt = \dots$$

Parc. zlomky $\frac{3}{y^2} = 3y^{-2}$ $3\frac{y^{-2+1}}{-2+1}$

$$\int x + \frac{-2}{x-2} + \frac{3}{(x-2)^2} + \frac{1}{2}\frac{2x-6}{x^2-6x+11} + \frac{-4}{x^2-6x+11}\,dx$$

$$= \frac{x^2}{2} + -2\ln|x-2| + \frac{-3}{(x-2)} + \frac{1}{2}\ln|x^2-6x+11| - 2\sqrt{2}\arctan\left(\frac{x-3}{\sqrt{2}}\right)$$

$x \neq 2$ $\quad x \in (-\infty,2),(2,\infty)$

$y = x^2-6x+11$

$dy = 2x-6\,dx$

$\int \frac{1}{2y}\,dy$

$x^2-6x+11 = (x-3)^2+2$

x^2-6x+9

$$\int \frac{-4}{2\left(\left(\frac{x-3}{\sqrt{2}}\right)^2+1\right)}\,dx = -2\sqrt{2}\arctan\frac{x-3}{\sqrt{2}}$$

$$\int \frac{x^5-10x^4+38x^3-60x^2+12x+49}{(x^2-4x+4)(x^2-6x+11)}\,dx$$

$\rightarrow x^4-10x^3+39x^2-68x+44$

- $\int \frac{P(x)}{Q(x)}\,dx$ $\quad st\,P \overset{?}{<} st\,Q$ $\quad 5 \not< 4$

$x(x^4-10x^3+39x^2-68x+44) + 10x^4-39x^3+68x^2-44x$

$-10x^4+38x^3-60x^2+12x+49$

$$= \int x + \frac{-x^3+8x^2-32x+49}{(x^2-4x+4)(x^2-6x+11)}\,dx$$

- $\int \frac{-x^3+8x^2-32x+49}{(x-2)^2(x^2-6x+11)}\,dx = \int \frac{A}{x-2} + \frac{B}{(x-2)^2} + \frac{Cx+D}{x^2-6x+11}$

$$\frac{A(x-2)(x^2-6x+11) + B(x^2-6x+11) + (Cx+D)(x-2)^2}{(x-2)^2(x^2-6x+11)}$$

$$= \frac{-x^3+8x^2-32x+49}{(x-2)^2(x^2-6x+11)}$$

$x=2$ $\quad B\cdot 3 = 9$ $\quad B=3$

$x = 0 \quad -22A + 11 \cdot 3 + 4D = 49$

$x = 1 \quad -6A + 18 + C + D = 24$

$x = 3 \quad 2A + 6 + 3C + D = -2$

$A = -2 \quad C = 1 \quad D = -7$

- $\int x + \frac{-2}{x-2} + \frac{3}{(x-2)^2} + \frac{x-7}{x^2-6x+11}\, dx$

$$\int \frac{x-7}{x^2-6x+11}\, dx = \int \frac{1}{2} \frac{2x-6+6-14}{x^2-6x+11}\, dx$$

Chceme

$$\frac{2x-6}{x^2-6x+11} = \int \frac{1}{2} \frac{2x-6}{x^2-6x+11} + \frac{-4}{x^2-6x+11}\, dx$$