2024 Ohiko A

A4 a) $\int \frac{2-3x+x^3}{x^2+2x+1}\,dx$ b) $\int \frac{2-3x}{x^2+2x+1}\,dx$

b) $\int \frac{-3x+2}{x^2+2x+1} = \int \frac{-3x+2}{(x+1)^2}$

Zatiki algebraikoa deskonposatzen da: Bi erro bikoitz daukat izend..

$$\frac{-3x+2}{(x+1)^2} = \frac{A}{x+1} + \frac{B}{(x+1)^2} = \frac{A(x+1)+B}{(x+1)^2}$$

$$-3x+2 = A(x+1)+B.$$

$x=-1 \longrightarrow \boxed{5=B}$

$x=0 \longrightarrow 2=A+5 \longrightarrow \boxed{A=-3.}$

$$I=\int \frac{-3x+2}{(x+1)^2} = \int \frac{-3}{x+1}\,dx + \int \frac{5}{(x+1)^2}\,dx =$$

$\frac{5}{(x+1)^2} \rightarrow 5(x+1)^{-2}$

$$= -3\ln(x+1) + 5\frac{(x+1)^{-1}}{-2+1} + k.$$

$$\boxed{I = -3\ln(x+1) - \frac{5}{x+1} + k.}$$

a) $\int \frac{2-3x+x^3}{x^2+2x+1}$

a) $\int \frac{2 - 3x + x^3}{x^2 + 2x + 1}\, dx$

Zenbakitzaileoren mailo, izendatzaileoreno baino handiagoo denez zatikatu:

$$\begin{array}{r|l} x^3 - 3x + 2 & x^2 + 2x + 1 \\ \hline -x^3 - 2x^2 - x & x - 2 \\ \hline -2x^2 - 4x + 2 & \\ +2x^2 + 4x + 2 & \\ \hline / \quad / \quad 4. & \end{array}$$

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

$$= \frac{x^2}{2} - 2x + 4 \cdot \frac{(x+1)^{-2+1}}{-2+1} = \boxed{\frac{x^2}{2} - 2x - \frac{4}{x+1} + k.}$$