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

CASO II: DENOMINADORES NO REALES, PUEDEN SER FACTORIZADOS, LO CUAL SERÍA

$x(1+x^2)$ $\quad 1+x^2=0 \quad x^2=-1/\sqrt{\ } \quad x \notin \mathbb{R}$

$\Delta = b^2-4ac$ $\quad \Delta > 0$: 2 SOL $\in \mathbb{R}$ $\quad \Delta = 0$: 2 SOL $\in \mathbb{R}$ $\quad \Delta < 0$: SOLUCIONES COMPLEJAS

$(x-1)(x+2)$ $\quad x \neq -2$

$\frac{A}{x} + \frac{Bx+C}{(1+x^2)}$

$x^2(x^2+x+1)$ $\quad x \cdot x$

$\frac{A}{x} + \frac{B}{x} + \frac{Cx+D}{x^2+x+1}$

$$\int \frac{1-x^2}{x(1+x^2)}\,dx = \int \frac{A}{x}\,dx + \int \frac{Bx+C}{1+x^2}$$

$\frac{1-x^2}{x(1+x^2)} = \frac{A}{x} + \frac{Bx+C}{1+x^2} = \frac{A(1+x^2)+x(Bx+C)}{x(1+x^2)}$ / $\cdot\, x(1+x^2)$

$1-x^2 = A(1+x^2) + x(Bx+C)$

$x=0$ $\quad 1-0^2 = A(1+0^2) + 0\cdot(B\cdot 0+C)$

$\boxed{1=A}$

$x=1$ $\quad 1-(1)^2 = 1(1+(1)^2) + 1\cdot(B\cdot 1+C)$

$0 = 2+B+C$ (1)

$\boxed{-2 = B+C}$ (1)

$x=2$ $\quad 1-(2)^2 = 1(1+2^2) + 2\cdot(2B+C)$

$1-4 = 1(5) + 4B+2C$

$-3 = 5+4B+2C$

$-3-5 = 4B+2C$

$-8 = 4B+2C$ (2) / $:2$

$\boxed{-4 = 2B+C}$ (2)

$-2 = B+C$ / $\cdot -2$

$-4 = 2B+C$

$\downarrow \quad 4 = -2B-2C \;]+(1)+(2)$

$-4 = 2B+C$

$0 = 0-C$

$0 = -C$ / $\cdot -1$

$\boxed{0 = C}$

$-2 = B+0 \quad \Rightarrow \boxed{B=-2}$

$\boxed{A=1}$ $\quad \boxed{B=-2}$ $\quad \boxed{C=0}$

$$\int \frac{A}{x}\,dx + \int \frac{Bx+C}{1+x^2}$$

$$\int \frac{1}{x}\,dx + \int \frac{-2x}{1+x^2}\,dx \quad -1$$

$\ln|x| - \int \frac{2x}{1+x^2}\,dx$

$\boxed{\ln|x| - \ln|1+x^2| + C}$

$\ln|x| - \int \frac{2x}{1+x^2}\,dx$ $\quad u = 1+x^2$ $\quad du = 2x\,dx$

$\ln|x| - \int \frac{du}{u}$

$\ln|x| - \ln|u| + C$

$\boxed{\ln|x| - \ln|1+x^2| + C}$

$\boxed{\ln\left(\frac{x}{1+x^2}\right) + C}$

$x(x-1)^2\,x^3(x+4)^2 = 0$

$x(x-1)^2 = 0$

$\boxed{x=0 \quad \vee \quad x=1 \quad \vee \quad x=1}$