

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

3 CASO: DENOMINADOR REAL DE GRADO 2

$$L: \frac{A}{x} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)}$$

$$\int \frac{3}{x(x-1)^2} dx \Leftrightarrow \int \frac{A}{x} dx + \int \frac{B}{(x-1)^2} dx + \int \frac{C}{(x-1)} dx$$

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

$$3 = A(x-1)^2 + Bx(x-1) + Cx$$

$$\text{si } x=0 \quad 3 = A(0-1)^2 + B \cdot 0(0-1) + C \cdot 0$$

$$3 = A(-1)^2$$

$$\text{si } x=1 \quad 3 = 3(\cancel{1-1})^2 + B \cdot 1(1-1) + C \cdot 1$$

$$3 = C$$

$$x=2 \quad 3 = 3(-1)^2 + B \cdot 2(-1-1) + 3 \cdot 1$$

$$3 = 3(-2)^2 - B \cdot 2 - 3$$

$$3 = 12 - 4 + 2B - 3$$

$$3 = 12 + 2B - 3$$

$$9 = 2B$$

$$-9 = -2B$$

$$-9 = -2B$$

$$\frac{9}{2} = B$$

$$-3 = B$$

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

$$\int \frac{3}{x} dx + \int \frac{-3}{(x-1)^2} dx + \int \frac{9}{(x-1)^2} dx$$

$$3 \cdot \int \frac{1}{x} dx - 3 \int \frac{1}{(x-1)^2} dx + 9 \int \frac{1}{(x-1)^2} dx \rightarrow u = x-1$$

$$3 \ln|x| - 3 \ln|x-1| + 3 \int \frac{1}{(x-1)^2} dx \quad u = x-1$$

$$3 \ln|x| - 3 \ln|x-1| + 3 \int \frac{1}{(x-1)^2} dx \quad \int u^a du = \frac{u^{a+1}}{a+1} + C$$

$$3 \ln|x| - 3 \ln|x-1| + 3 \int u^{-2} du$$

$$3 \ln|x| - 3 \ln|x-1| + 3 \frac{u^{-2+1}}{-2+1} + C$$

$$3 \ln|x| - 3 \ln|x-1| - 3(x-1)^{-1} + C$$

$$3 \ln|x| - 3 \ln|x-1| - \frac{3}{(x-1)} + C$$