



Nombre del Alumno: Marely Concepción Jiménez Gordillo

Nombre del tema: Problemario

Nombre de la materia: Matemática Aplicada

Nombre del profesor: Vania Natali Santizo Morales

Nombre de la Licenciatura: Técnico en enfermería general

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Plataforma

$$\int \frac{1}{x^2+4x-5} dx$$

$$x^2+4x-5 = (x+5)(x-1)$$

$$u = x+2 \quad x = u-2 \quad dx = du$$

$$\int \frac{1}{x^2+4x-5} dx = \int \frac{1}{(u-2)^2+4(u-2)-5} du$$

$$(u-2)^2 = u^2 - 4u + 4$$

$$4(u-2) = 4u - 8$$

$$u^2 - 4u + 4 + 4u - 8 - 5 = u^2 - 9$$

$$\int \frac{1}{x^2+4x-5} dx = \int \frac{1}{u^2-9} du$$

$$\int \frac{1}{u^2-a^2} du = \frac{1}{2a} \ln \left| \frac{u-a}{u+a} \right| + C = \frac{1}{6} \ln \left| \frac{u-3}{u+3} \right| + C$$

$$\int \frac{1}{x^2+4x-5} dx = \frac{1}{6} \ln \left| \frac{x-1}{x+5} \right| + C$$

No es necesario completar el cuadrado.

$$\int \frac{1}{x^2-10x+30} dx$$

$$x^2-10x+30 = (x-5)^2+5$$

$$(x-5)^2 = x^2-10x+25 \quad x^2-10x+30 = (x-5)^2+5$$

$$u = x-5 \quad x = u+5 \quad dx = du$$

$$\int \frac{1}{(x-5)^2+5} dx = \int \frac{1}{u^2+5} du$$

$$\int \frac{1}{u^2+a^2} du = \frac{1}{a} \arctan \left(\frac{u}{a} \right) + C \quad a^2=5 \quad a=\sqrt{5}$$

$$\frac{1}{\sqrt{5}} \arctan \left(\frac{u}{\sqrt{5}} \right) + C \quad u = x-5$$

$$\int \frac{1}{x^2-10x+30} dx = \frac{1}{\sqrt{5}} \arctan \left(\frac{x-5}{\sqrt{5}} \right) + C$$

Si es necesario completar el cuadrado

$$\int \frac{1}{x^2+6x+10} dx$$

$$x^2+6x+10$$

$$x^2+6x+10 = (x+3)^2 + 1$$

$$(x+3)^2 = x^2+6x+9 \quad x^2+6x+10 = (x+3)^2 + 1$$

$$u = x+3 \quad du = dx$$

$$\int \frac{1}{u^2+1} du$$

$$\int \frac{1}{u^2+1} du = \arctan(u) + C \quad u = x+3$$

$$\int \frac{1}{x^2+6x+10} dx = \arctan(x+3) + C$$

Si es necesario completar el cuadrado.

$$\int (x^2+8x+21) dx$$

$$\int (x^2+8x+21) dx = \int x^2 dx + \int 8x dx + \int 21 dx$$

$$\frac{x^3}{3} + \frac{x^2}{8 \cdot 2} + 21x + C = \frac{x^3}{3} + \frac{x^2}{4} + 21x + C$$

No es necesario completar el cuadrado.

$$\int \frac{1}{x^2+2x-8} dx$$

$$x^2+2x-8 = (x+1)^2 - 9$$

$$(x+1)^2 = x^2+2x+1 \quad (x+1)^2 - 9 = x^2+2x-8$$

$$u = x+1 \quad du = dx$$

$$\int \frac{1}{u^2-9} du \quad \int \frac{1}{u^2-a^2} du = \frac{1}{2a} \ln \left| \frac{u-a}{u+a} \right| + C \quad \int \frac{1}{u^2-9} du = \frac{1}{6} \ln \left| \frac{u-3}{u+3} \right| + C$$

$$u-3 = x+1-3 = x-2 \quad u+3 = x+1+3 = x+4$$

$$\int \frac{1}{x^2+2x-8} dx = \frac{1}{6} \ln \left| \frac{x-2}{x+4} \right| + C$$

No es necesario completar el cuadrado.

$$\int \frac{1}{x^2 - 8x + 20} dx$$

$$x^2 - 8x + 20 = (x-4)^2 + 4$$

$$(x-4)^2 = x^2 - 8x + 16 \quad (x-4)^2 + 4 = x^2 - 8x + 20$$

$$u = x - 4 \quad du = dx$$

$$\int \frac{1}{u^2 + 4} du$$

$$\int \frac{1}{u^2 + a^2} du = \frac{1}{a} \arctan\left(\frac{u}{a}\right) + C$$

$$a^2 = 4 \quad a = 2$$

$$\int \frac{1}{u^2 + 4} du = \frac{1}{2} \arctan\left(\frac{u}{2}\right) + C$$

$$\frac{u}{2} = \frac{x-4}{2}$$

$$\int \frac{1}{x^2 - 8x + 20} dx = \frac{1}{2} \arctan\left(\frac{x-4}{2}\right) + C$$

Si es necesario completar el cuadrado

$$\int \frac{1}{x^2 + 12x + 27} dx$$

$$x^2 + 12x + 36 - 9 = (x+6)^2 - 9$$

$$x^2 + 12x + 27 = (x+6)^2 - 9$$

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

$$u = x + 6 \quad du = dx$$

$$\int \frac{1}{u^2 - 9} du$$

$$\int \frac{1}{u^2 - 3^2} du = \frac{1}{2 \cdot 3} \ln \left| \frac{u-3}{u+3} \right| + C = \frac{1}{6} \ln \left| \frac{u-3}{u+3} \right| + C$$

$$\int \frac{1}{x^2 + 12x + 27} dx = \frac{1}{6} \ln \left| \frac{x+3}{x+9} \right| + C$$

No es necesario completar el cuadrado

$$\int \frac{1}{x^2 - 10x + 16} dx$$

$$x^2 - 10x + 25 - 9 = (x-5)^2 - 9$$

$$x^2 - 10x + 16 = (x-5)^2 - 9$$

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

$$u = x - 5 \quad du = dx$$

$$\int \frac{1}{u^2 - 9} du$$

$$\int \frac{1}{u^2 - a^2} du = \frac{1}{2a} \ln \left| \frac{u-a}{u+a} \right| + c$$

$$\frac{1}{2 \cdot 3} \ln \left| \frac{u-3}{u+3} \right| + c = \frac{1}{6} \ln \left| \frac{u-3}{u+3} \right| + c$$

$$\int \frac{1}{x^2 - 10x + 16} dx = \frac{1}{6} \ln \left| \frac{x-8}{x-2} \right| + c$$

Si es necesario completar el cuadrado.