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**Nombre del trabajo: Examen unidad IV**

**Materia: Matemáticas aplicada**

**Grado: 6to cuatrimestre**

**Grupo: “A”**

Comitán de Domínguez Chiapas a 2 de Agosto de 2022.

1.- $\int \frac{dx}{x^2+81} =$

fórmula:

$$\int \frac{dv}{v^2+a^2} = \frac{1}{a} \arctan \frac{v}{a}$$

$v^2 = x^2 \quad a^2 = 81$

$v = x \quad a = 9$

$dv = dx$

$$R = \boxed{\int \frac{1}{9} \arctan \frac{x}{9} + c}$$

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2. $\int \frac{dx}{9x^2-144}$ $\int \frac{dx}{x\sqrt{(3x)^2-12^2}}$

fórmula:

$v^2 - a^2$

$v = a \sec\theta$

$3x = 12 \sec\theta$

$x = \frac{12}{3} \sec\theta$

$dx = \frac{12}{3} \sec\theta \tan\theta \, d\theta$

$v = 3x \quad a = 12$

$$\int \frac{\frac{12}{3}\sec\theta \tan\theta \, d\theta}{\left(\frac{12}{3}\sec\theta\right)\sqrt{12^2\sec^2\theta - 12^2}}$$

$$\int \frac{\tan\theta \, d\theta}{\sqrt{12^2(\sec\theta - 3}} = \frac{\tan\theta \, d\theta}{\sqrt{12^2\tan^2\theta}}$$

$$\int \frac{\tan\theta \, d\theta}{\sqrt{12^2\tan^2\theta}} = \int \frac{\tan\theta \, d\theta}{12 \tan\theta}$$

$$= \boxed{\frac{1}{12} \int d\theta = \frac{1}{2}\theta + c}$$

$(3x)^2 = 12^2 \sec^2\theta$

$\tan^2\theta + 1 = \sec^2\theta$

$\tan^2\theta = \sec^2\theta - 1$

$3x = 12 \sec\theta$

$12 \sec\theta = 3x$

$\sec\theta = \frac{3x}{12}$

$\theta = \operatorname{arcsec}\left(\frac{3x}{12}\right)$

$= \frac{1}{12} \operatorname{arcsec}\left(\frac{3x}{12}\right) + c$

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3.- $\int \frac{dx}{\sqrt{25-9x^2}} =$

fórmula:

$$\int \frac{dx}{\sqrt{a^2-v^2}} = \arcsin \frac{v}{a} + c$$

$v^2 = 9x^2 \quad a^2 = 25$

$v = 3x \quad a = 5$

$\frac{dv}{3} = 3\,dx$

$\int \frac{dx}{\sqrt{a^2-v^2}}$

$\int \frac{dv}{\sqrt{a^2-v^2}}$

$= \operatorname{arc\,sen} \frac{3x}{5} + c \rightarrow$ $R = \boxed{\frac{1}{3} \operatorname{arc\,sen} \frac{3x}{5} + c}$

4.- $\int \frac{dx}{4x^2-7}$

fórmula:

$$\int \frac{dv}{\sqrt{v^2 \pm a^2}} = \ln\left|v + \sqrt{v^2 \pm a^2}\right| + c$$

$\frac{1}{2} \int \frac{d(x)}{\sqrt{(2x)^2-7}}$

$$R = \boxed{\frac{1}{2} \ln\left|2x + \sqrt{4x^2-7}\right| + c}$$

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5.- $\int \frac{dx}{x\sqrt{4x^2-9}} =$

fórmula:

$$\int \frac{dv}{v\sqrt{v^2-a^2}} = \frac{1}{a} \operatorname{arc\,sec} \frac{v}{a}$$

$v^2 = 4x^2 \quad a^2 = 9$

$v = 2x \quad a = 3$

$dv = 2dx$

$\frac{\int 2dx}{2x\sqrt{4x^2-9}}$

$$\boxed{R = \frac{1}{3} \operatorname{arc\,sec} \frac{2x}{3} + c}$$

6.- $\int \frac{dx}{25-4x^2}$

fórmula:

$$\int \frac{dx}{a^2-x^2} = \frac{1}{2a} \log\left|\frac{a+x}{a-x}\right| c$$

$\frac{1}{4} \int \frac{dx}{\left(\frac{5}{2}\right)^2 - x^2}$

$\log \frac{\frac{5}{2}+x}{\frac{5}{2}-x} + c$

$= \frac{1}{4} \times \frac{1}{2 \times \frac{5}{2}}$

$$R = \boxed{\frac{1}{20} \log\left|\frac{5+2x}{5-2x}\right| + c}$$

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7.- $\frac{dy}{y^2-16}$

FÓRMULA:

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

$\int \frac{dy}{y^2-4^2}$

$$R = \boxed{\frac{1}{8} \ln\left|\frac{y-4}{y+4}\right| + c}$$

8.- $\frac{dx}{x^2+36} =$

Fórmula:

$$\int \frac{dv}{v^2+a^2} = \frac{1}{a} \arctan \frac{v}{a}$$

$v^2 = x^2 \quad a^2 = 36$

$v = x \quad a = 6$

$dv = dx$

$$R = \boxed{\frac{1}{6} \arctan \frac{x}{6} + c}$$

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9.- $\frac{dx}{16x^2-9} =$

fórmula:

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

$\frac{1}{4} \int \frac{d(4x)}{(4x)^2-3^2}$

$\frac{1}{4} \cdot \frac{1}{6} \ln\left|\frac{4x-3}{4x+3}\right| + c$

$$R = \boxed{\int \frac{1}{24} \ln\left|\frac{4x-3}{4x+3}\right| + c}$$

10.- $\int \frac{dx}{\sqrt{9-25x^2}} =$

fórmula:

$$\int \frac{dv}{\sqrt{a^2-v^2}} = \operatorname{arc\,sen} \frac{v}{a} + c$$

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

$$R = \boxed{\int \frac{1}{5} \cdot \operatorname{arc\,sen}\left(\frac{5x}{3}\right) + c}$$

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