2. Halle las sig. integrales usando una sustitución adecuada.

- $$\int \frac{4x^2}{\sqrt[5]{2x^3+3}}\,dx$$

$u = 2x^3 + 3$

$du = 6x^2\,dx$

$\frac{du}{6} = x^2\,dx$

$$\Rightarrow \frac{4}{6}\int \frac{du}{\sqrt[5]{u}}$$

$$= \frac{4}{6}\int u^{-1/5}\,du = \frac{4}{6}\cdot\frac{5}{4}\,u^{4/5} + C$$

$$= \frac{5}{6}\left(2x^3+3\right)^{4/5} + C$$

- $$\int \frac{2}{x^2}\sqrt[3]{1-\frac{1}{x}}\,dx$$

$u = 1 - \frac{1}{x}$

$du = \frac{1}{x^2}\,dx$

$$\int 2\sqrt[3]{u}\,du$$

$$2\int u^{1/3}\,du = 2\cdot\frac{3}{4}\,u^{4/3} + C = \frac{3}{2}\left(1 - 1/x\right)^{4/3} + C$$

$$\cdot \int (-x^2+2x-2)\, e^{x^3-3x^2+6x}\, dx$$

$$u = x^3 - 3x^2 + 6x$$

$$du = (3x^2 - 6x + 6)\, dx$$

$$du = 3(x^2 - 2x + 2)\, dx$$

$$du = -3(-x^2 + 2x - 2)\, dx$$

$$-\frac{du}{3} = (-x^2 + 2x - 2)\, dx$$

$$\Rightarrow \quad -\frac{1}{3}\int e^u\, du = -\frac{1}{3}e^u + C = -\frac{1}{3}e^{x^3-3x^2+6x} + C$$

Para pensar:

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\, dx$$

$$u = \sqrt{x}$$

$$du = \frac{1}{2\sqrt{x}}\, dx$$

$$2du = \frac{dx}{\sqrt{x}}$$

$$\Rightarrow 2\int e^u\, du$$

$$2e^u + C$$

$$2e^{\sqrt{x}} + C \;//$$

$$\cdot \int \frac{\ln^2|x|}{x}\, dx$$

$$u = \ln|x|$$

$$du = \frac{1}{x}\, dx$$

$$\Rightarrow \int u^2\, du = \frac{u^3}{3} + C$$

$$= \frac{\ln^3|x|}{3} + C$$