

Find $\int x^3 \cos(x^4 + 2) dx$

$$\int x^3 \cos(u) \frac{du}{4x^3}$$

$$u = x^4 + 2$$
$$du = 4x^3 dx$$
$$\frac{du}{4x^3} = dx$$

$$\frac{1}{4} \int \cos(u) du$$

$$\frac{1}{4} \sin(u) = \boxed{\frac{1}{4} \sin(x^4 + 2)}$$

$$\int \frac{x^3}{x^4 - 5} dx$$

$$u = x^4 - 5$$

$$du = 4x^3 dx$$

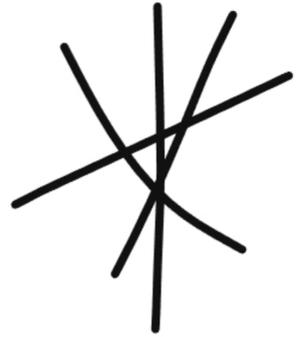
$$\frac{du}{4x^3} = dx$$

$$\int \frac{\cancel{x^3}}{u} \cdot \frac{du}{\cancel{4x^3}}$$

$$\frac{1}{4} \int \frac{1}{u} du = \frac{1}{4} \ln |u| =$$

$$\boxed{\frac{1}{4} \ln |x^4 - 5| + C}$$

$$\int (x^{1.3} + 11x^{4.5}) dx = \frac{x^{2.3}}{2.3} + \frac{11}{5.5} x^{5.5}$$



$$= \boxed{\frac{x^{2.3}}{2.3} + 2x^{5.5} + C}$$

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

$$\int \frac{e^u}{\cancel{u}} \cdot \cancel{2\sqrt{x}} du$$

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

$$2 \int e^u du = 2e^u \Rightarrow \boxed{2e^{\sqrt{x}} + C}$$

$$\int_1^{16} x^{-\frac{3}{4}} dx$$

$$-\frac{3}{4} + 1 = \frac{1}{4}$$

$$\begin{aligned} * \frac{x^{\frac{1}{4}}}{\frac{1}{4}} \Big|_1^{16} &= 4\sqrt[4]{x} \Big|_1^{16} = 4(2 - 1) = \textcircled{4} \\ &4(\sqrt[4]{16} - \sqrt[4]{1}) \end{aligned}$$

$$\int_0^1 (1-x)^9 dx$$

$$u = 1-x$$
$$du = -dx$$
$$-du = dx$$

$$- \int_0^1 u^9 du$$

$$- \left. \frac{u^{10}}{10} \right|_0^1 = - \left(\frac{1^{10}}{10} - \frac{0^{10}}{10} \right) = - \frac{1}{10}$$

$$\int \frac{e^x}{(7-e^x)^2} dx$$

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$$\int \frac{e^x}{(u)^2} \frac{du}{-e^x}$$

$$\int \frac{1}{u^2} du = -\left(\frac{1}{u}\right) = \frac{1}{(7-e^x)} + C$$

$$u = 7 - e^x$$

$$du = -e^x dx$$

$$\frac{du}{-e^x} = dx$$

$$\int \frac{1}{u^2} = u^{-2}$$

$$= -u^{-1}$$

$$\frac{1}{2} \int \frac{x^2}{\sqrt{u}} du = \frac{1}{2} \int \frac{u-1}{u^{1/2}} du$$

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

$$= \frac{1}{2} \left(\frac{u^{3/2}}{3/2} - \frac{u^{1/2}}{1/2} \right)$$

$$= \frac{1}{2} \left(\frac{2}{3} u^{3/2} - 2u^{1/2} \right)$$

$$= \boxed{\frac{1}{3} (x^2+1)^{3/2} - (x^2+1)^{1/2} + C}$$

$$\int_0^1 \sin(3\pi t) dt$$

$$\int_0^1 \sin(u) \frac{du}{3\pi}$$

$$u = 3\pi t$$
$$du = 3\pi dx$$
$$\frac{du}{3\pi} = dx$$

$$\frac{1}{3\pi} \int_0^1 \sin(u) du = \frac{1}{3\pi} (-\cos(3\pi t)) \Big|_0^1 = \frac{1}{3\pi} (1 - (-1))$$
$$= \frac{2}{3\pi}$$

$$\int_{-4}^4 (2x - \sqrt{16 - x^2}) dx$$

$$\int (2x - \sqrt{u}) \frac{du}{-2x}$$

$$\int \frac{2x}{-2x} - \frac{\sqrt{u}}{-2x} du$$

$$\int -1 + \frac{\sqrt{u}}{2x} du$$

$$u = 16 - x^2$$
$$du = -2x dx$$

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

$$\int_{-4}^4 (2x - \sqrt{16 - x^2}) dx$$

$$= 32 - 8\pi$$

$$\int_{-4}^4 2x dx - \int_{-4}^4 \sqrt{16 - x^2} dx$$

$$u = 16 - x^2$$

$$du = -2x dx$$

$$x^2 \Big|_{-4}^4$$

$$16 + 16$$

$- 8\pi$ you

can't do

$$\sqrt{16 - x^2} = y$$

$$16 - x^2 = y^2$$

$$16 = x^2 + y^2$$

$$y^2 = x^2 + y^2$$

