$$\int (3x^5 - 7x^3 + 8)\,dx = 3\frac{x^6}{6} - 7\frac{x^4}{4} + 8x + c \qquad x \in (-\infty, +\infty)$$

$$\int (3\cos x - 7\sin x + 2e^x)\,dx = 3\sin x + 7\cos x + 2e^x + c$$

$$x \in (-\infty, +\infty)$$

$$\int \frac{(x-2)^2}{x}\,dx = \int \frac{x^2 - 4x + 4}{x}\,dx = \int \left(\frac{x^2}{x} - \frac{4x}{x} + \frac{4}{x}\right) dx =$$

$$= \int \left(x - 4 + \frac{4}{x}\right) dx = \frac{x^2}{2} - 4x + 4\ln|x| + c$$

$x \in (-\infty, 0)$ nebo $\in (0, +\infty)$

$$\int \sqrt[4]{x}\,(4x+12)\,dx = \int x^{\frac{1}{4}}(4x+12)\,dx = \int \left(4x^{\frac{5}{4}} + 12x^{\frac{1}{4}}\right)dx =$$

$$= 4\,\frac{x^{\frac{9}{4}}}{\frac{9}{4}} + 12\cdot\frac{x^{\frac{5}{4}}}{\frac{5}{4}} + c = \frac{16}{9}\sqrt[4]{x^9} + \frac{48}{5}\sqrt[4]{x^5} + c$$

$x \in (0, +\infty)$

$$\int \frac{x^2-2}{x^2+1}\,dx = \int \frac{x^2+1-3}{x^2+1}\,dx = \int \left(\underbrace{\frac{x^2+1}{x^2+1}}_{1} - \frac{3}{x^2+1}\right)dx =$$

$$= x - 3\,\mathrm{arctg}\,x + c$$

$x \in (-\infty, +\infty)$

Metoda per partes

$$(u \cdot v)' = u' \cdot v + u \cdot v'$$

$$\int u \cdot v' = \int (u \cdot v)' - \int u' \cdot v$$

$$\boxed{\int u \cdot v' = u \cdot v - \int u' \cdot v}$$

$$\int x^2\cos x\,dx = x^2\sin x - \int 2x\sin x\,dx = x^2\sin x - \left(-2x\cos x + 2\int \cos x\,dx\right) =$$

$u = x^2 \qquad u' = 2x$

$v' = \cos x \qquad v = \sin x$

$u = 2x \qquad u' = 2$

$v' = \sin x \qquad v = -\cos x$

$$= x^2\sin x + 2x\cos x - 2\sin x + C \qquad x \in (-\infty, +\infty)$$

$$\int x^2 \ln x \, dx = \frac{x^3}{3}\ln x - \int \frac{x^3}{3}\cdot\frac{1}{x}\, dx = \frac{x^3}{3}\ln x - \frac{1}{3}\int x^2 \, dx =$$

$$u = x^2 \qquad u' = 2x$$

$$v' = \ln x \qquad v = ?$$

$$= \frac{x^3}{3}\ln x - \frac{x^3}{9} + c \qquad x \in (0, +\infty)$$

$$u = \ln x \qquad u' = \frac{1}{x}$$

$$v' = x^2 \qquad v = \frac{x^3}{3}$$

$$\int x \ln^2 x \, dx = \frac{x^2}{2}\ln^2 x - \int x \cdot \ln x \, dx = *$$

$u = \ln^2 x \qquad u' = 2\ln x \cdot \frac{1}{x}$

$v' = x \qquad v = \frac{x^2}{2}$

$u = \ln x \qquad u' = \frac{1}{x}$

$v' = x \qquad v = \frac{x^2}{2}$

$$* = \frac{x^2}{2}\ln^2 x - \left(\frac{x^2}{2}\ln x - \frac{1}{2}\int x\,dx\right) = \frac{x^2}{2}\ln^2 x - \frac{x^2}{2}\ln x + \frac{x^2}{4} + c$$

$x \in (0, +\infty)$

$\ln^2 x = (\ln x)^2 = \ln x \cdot \ln x$

$\ln(x^2)$

$$\int \frac{\ln x}{x}\,dx = \int \ln x \cdot \frac{1}{x}\,dx = \ln^2 x - \int \ln x \cdot \frac{1}{x}\,dx$$

$$\cancel{u = \ln x \qquad u' = \frac{1}{x}}$$

$$\cancel{v' = \frac{1}{x} \qquad v = \ln x}$$

$$x \in (0, +\infty)$$

$$\int \frac{\ln x}{x}\,dx = \ln^2 x - \int \frac{\ln x}{x}\,dx \quad \Big/ + \int \frac{\ln x}{x}\,dx$$

$$2\int \frac{\ln x}{x}\,dx = \ln^2 x \quad \Big/ : 2$$

$$\int \frac{\ln x}{x}\,dx = \frac{1}{2}\ln^2 x + C$$

$$\int \frac{\ln x}{x}\,dx = \int t\,dt =$$

$$t = \ln x$$

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

$$= \frac{t^2}{2} + C =$$

$$= \frac{\ln^2 x}{2} + C$$

$$\int \sin^2 x\,dx = -\sin x\cos x + \int \cos^2 x\,dx = -\sin x\cos x + \int (1-\sin^2 x)\,d$$

$\cancel{u = \sin x \quad u' = \cos x}$

$\cancel{v' = \sin x \quad v = -\cos x}$

$$\boxed{\sin^2 x + \cos^2 x = 1}$$

$$\cos^2 x = 1 - \sin^2 x$$

$$\int \sin^2 x\,dx = -\sin x\cos x + x - \int \sin^2 x\,dx \quad \Big/ + \int \sin^2 x\,dx$$

$$2\int \sin^2 x\,dx = x - \sin x\cos x \quad \Big/ :2$$

$$\int \sin^2 x\,dx = \frac{x - \sin x\cos x}{2} + c$$

$$\int \sin^2 x \, dx$$

$$\cos 2x = \cos^2 x - \sin^2 x = 1 - 2\sin^2 x \longrightarrow \boxed{\sin^2 x = \frac{1-\cos 2x}{2}}$$

$$\cos^2 x = 1 - \sin^2 x$$

$$\sin 2x = 2 \sin x \cos x$$

$$\int \sin^2 x \, dx = \int \left(\frac{1}{2} - \frac{\cos 2x}{2} \right) dx = \frac{1}{2} x - \frac{\sin 2x}{4} + C$$