Studio integrali

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8) $\int_0^1 x * e^x = e^x * x - \int e^x = e^x x - e^x$
$[e^x x - e^x]_0^1 = (e^x - e^x) - (-1) = +1$

9) $f(x) = -xsinx$
Primitive:
$-x - \cos x - \int \cos x$
$-x\cos x + \sin x + c$
Determinare $\alpha(\pi) = 2\alpha(0)$
$-\pi cos\pi + sin\pi + c = 2(\sin 0 + c)$
$\pi + c = 2c$
$c = \pi$
$-xcosx - \sin x + \pi$
$\int_0^\pi f(x)$
$(-\pi\cos\pi + \sin\pi)$
π

10) $\int_0^1 x^2 * \arctan x$
$\frac{x^3}{3} * \arctan x - \int_0^1 \frac{x^3}{3} * \frac{1}{1+x^2} = \frac{x^3}{3(1+x^2)}$
$\frac{x^3}{3} * \arctan x - \frac{1}{3}\int_0^1 x - \frac{x}{1+x^2}$
-> Scomposizione strana, non guardatela
$\frac{x^3}{3} * \arctan x - \frac{1}{6}\int_0^1 2x - \frac{2x}{1+x^2}$
$\frac{x^3}{3} * \arctan x - \frac{1}{6} * \frac{2x^2}{2} - \frac{1}{6}\ln(1+x^2)$
$\left[\frac{x^3}{3} * \arctan x - \frac{2x^2}{12} - \frac{1}{6}\ln(1+x^2)\right]_0^1$
$\left(\frac{\arctan 1}{3} - \frac{1}{16} - \frac{1}{6}\ln 2\right)$

11) $\int_0^{\frac{\pi}{3}} x^2 \sin x$
$x^2 \to 2x$
$-\cos x \to \sin x$
$x^2 * -\cos x - \int 2x * -\cos x$
$x^2 * -\cos x + \int 2x * \cos x$
$2x \to 2$
$\cos x \to \sin x$
$-\cos x * x^2 + 2x * \sin x - \int 2\sin x$
$-\cos x * x^2 + 2x\sin x + 2\cos x + c$
$[-\cos x * x^2 + 2x\sin x + 2\cos x]_0^{\frac{\pi}{3}}$
$\left(-\cos\frac{\pi}{3} * \frac{\pi^2}{9} + 2 * \frac{\pi}{3}\sin\frac{\pi}{3} + 2\cos\frac{\pi}{3}\right) - 2$