

$$I_3 = \int \frac{u}{4+n^2} \cdot \frac{4+n^2}{2} du = \frac{1}{2} \int u du = \frac{1}{2} \left(\frac{u^2}{2} \right) + C = \frac{u^2}{4} + C$$

$$I_3 = \frac{1}{4} \left(\arctan \frac{n}{2} \right)^2 + C$$

$$(4) I_4 = \int \frac{e^{1/n}}{n^2} dn$$

on pose, $t = \frac{1}{n}$ $dt = -\frac{dn}{n^2} \rightarrow dn = -n^2 dt$

$$I_4 = \int \frac{e^t}{n^2} (-n^2 dt) = -\int e^t dt = -e^t + C$$

$$I_4 = -e^{\frac{1}{n}} + C$$

Exo 4:

anal. $\int \frac{u'}{u} = \ln|u| + C$; $\int \frac{u'}{u^n} = \frac{-1}{(n-1)} \frac{1}{u^{n-1}} + C$

$$\int \frac{dn}{(n+b)^2 + a^2} = \frac{1}{a} \arctan \left(\frac{n+b}{a} \right) + C$$

$$1 - I_1 = \int \frac{n^3 dn}{n^3 + 2n^2 + n} = \int \frac{n^2}{n^2 + 2n + 1} dn = \int \frac{n^2 + 2n + 1 - 2n - 1}{n^2 + 2n + 1} dn$$

$$= \int 1 - \frac{2n+1}{n^2 + 2n + 1} dn = \int dn - \int \frac{2n+1}{n^2 + 2n + 1} dn$$

$$= \int dn - \int \frac{2n+1+2-2}{n^2 + 2n + 1} dn$$