31.19 1)

$$\int_0^{\frac{\pi}{4}} \frac{x+2}{\sigma\upsilon\nu^2 x}dx = \int_0^{\frac{\pi}{4}} (x+2)(\varepsilon\varphi x)' dx = \left[(x+2)\varepsilon\varphi x\right]_0^{\frac{\pi}{4}} - \int_0^{\frac{\pi}{4}} (x+2)'\varepsilon\varphi x dx =$$

$$= \frac{\pi}{4} + 2 + \int_0^{\frac{\pi}{4}} \frac{-\eta\mu x}{\sigma\upsilon\nu x}dx = \frac{\pi}{4} + 2 + \left[\ln(\sigma\upsilon\nu x)\right]_0^{\frac{\pi}{4}} = \frac{\pi}{4} + 2 + \ln\frac{\sqrt{2}}{2}$$

31.19 2)

$$\int_0^{\frac{\pi}{4}} \frac{x}{\sigma\upsilon\nu^2 x}dx = \int_0^{\frac{\pi}{4}} x(\varepsilon\varphi x)' dx = \left[x\varepsilon\varphi x\right]_0^{\frac{\pi}{4}} - \int_0^{\frac{\pi}{4}} (x)'\varepsilon\varphi x dx = \frac{\pi}{4} - \int_0^{\frac{\pi}{4}} \frac{\eta\mu x}{\sigma\upsilon\nu x}dx =$$

$$= \frac{\pi}{4} + \int_0^{\frac{\pi}{4}} \frac{-\eta\mu x}{\sigma\upsilon\nu x}dx = \frac{\pi}{4} + \left[\ln(\sigma\upsilon\nu x)\right]_0^{\frac{\pi}{4}} = \frac{\pi}{4} + \ln\frac{\sqrt{2}}{2} = \frac{\pi + 4\ln\frac{\sqrt{2}}{2}}{4} =$$

$$= \frac{\pi + 4\ln\frac{4}{16}}{4} = \frac{\pi - 4\ln 4}{4}$$

31.19 3)

$$\int_0^{\frac{\pi}{4}} \frac{x+3}{\sigma\upsilon\nu^2 x}dx = \int_0^{\frac{\pi}{4}} (x+3)(\varepsilon\varphi x)' dx = \left[(x+3)\varepsilon\varphi x\right]_0^{\frac{\pi}{4}} - \int_0^{\frac{\pi}{4}} (x+3)'\varepsilon\varphi x dx =$$

$$\frac{\pi}{4} + 3 - \int_0^{\frac{\pi}{4}} \frac{\eta\mu x}{\sigma\upsilon\nu x}dx = \frac{\pi}{4} + 3 + \int_0^{\frac{\pi}{4}} \frac{-\eta\mu x}{\sigma\upsilon\nu x}dx = \frac{\pi}{4} + 3 + \left[\ln(\sigma\upsilon\nu x)\right]_0^{\frac{\pi}{4}} = \frac{\pi}{4} + 3 + \ln\frac{\sqrt{2}}{2} =$$

$$= \frac{\pi + 12 + 4\ln\frac{\sqrt{2}}{2}}{4} = \frac{\pi + 12 + 4\ln\frac{4}{16}}{4} = \frac{\pi + 12 - 4\ln 4}{4}$$

31.19 4)

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{x}{\eta\mu^2 x}dx = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} x(-\sigma\varphi x)' dx = \left[-x\sigma\varphi x\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} - \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (x)'(-\sigma\varphi x)dx =$$

$$= \frac{\pi}{4} + \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{\sigma\upsilon\nu x}{\eta\mu x}dx = \frac{\pi}{4} + \left[\ln(\eta\mu x)\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} = \frac{\pi}{4} - \ln\frac{\sqrt{2}}{2} = \frac{\pi - 4\ln\frac{\sqrt{2}}{2}}{4} = \frac{\pi - \ln\frac{4}{14}}{4}$$
$$= \frac{\pi + \ln 4}{4}$$

31.19 5)

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{x-1}{\eta\mu^2 x}dx = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (x-1)(-\sigma\varphi x)' dx = \left[-(x-1)\sigma\varphi x\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} - \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (x-1)'(-\sigma\varphi x)dx =$$

$$= \frac{\pi}{4} - 1 + \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{\sigma\upsilon\nu x}{\eta\mu x}dx = \frac{\pi}{4} - 1 + \left[\ln(\eta\mu x)\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} = \frac{\pi}{4} - 1 - \ln\frac{\sqrt{2}}{2} = \frac{\pi - 4 - 4\ln\frac{\sqrt{2}}{2}}{4} =$$

$$= \frac{\pi - 4 - \ln \frac{4}{14}}{4} = \frac{\pi - 4 + \ln 4}{4}$$