15.10 1)

α) $\left(\dfrac{\eta\mu x}{e^x}\right)' = \dfrac{(\eta\mu x)'e^x - \eta\mu x\left(e^x\right)'}{\left(e^x\right)^2} = \dfrac{e^x\sigma\upsilon\nu x - e^x\eta\mu x}{e^{2x}}$

β) $\left(\dfrac{x^2-x}{\sigma\upsilon\nu x}\right)' = \dfrac{\left(x^2-x\right)'\sigma\upsilon\nu x - \left(x^2-x\right)(\sigma\upsilon\nu x)'}{\sigma\upsilon\nu^2 x} = \dfrac{(2x-1)\sigma\upsilon\nu x + \left(x^2-x\right)\eta\mu x}{\sigma\upsilon\nu^2 x}$

15.10 2)

$$\frac{\left(x^4\right)'\eta\mu x - x^4(\eta\mu x)'}{(\eta\mu x)^2} = \frac{4x^3\eta\mu x - x^4\sigma\upsilon\nu x}{\eta\mu^2 x}$$

15.10 3)

$$\frac{\left(7x^5\right)'e^x - 7x^5\left(e^x\right)'}{\left(e^x\right)^2} = \frac{35x^4e^x - 7x^5e^x}{e^{2x}}$$

15.10 4)

$$\frac{\left(2\sqrt{x}\right)'\eta\mu x - 2\sqrt{x}(\eta\mu x)'}{(\eta\mu x)^2} = \frac{\frac{\cancel{2}^{1}}{\cancel{2}\sqrt{x}}\eta\mu x - 2\sqrt{x}\sigma\upsilon\nu x}{\eta\mu^2 x}$$

15.10 5)

$$\frac{(\eta\mu x)'\ln x - \eta\mu x(\ln x)'}{(\ln x)^2} = \frac{\sigma\upsilon\nu x\cdot\ln x - \frac{1}{x}\eta\mu x}{\ln^2 x}$$

15.10 6)

$$\frac{\left(3x^7\right)'\sigma\upsilon\nu x - 3x^7(\sigma\upsilon\nu x)'}{(\sigma\upsilon\nu x)^2} = \frac{21x^6\sigma\upsilon\nu x + 3x^7\eta\mu x}{\sigma\upsilon\nu^2 x}$$

15.10 7)

$$\frac{\left(6x^2\right)'7^x - 6x^2\left(7^x\right)'}{\left(7^x\right)^2} = \frac{12x\cdot 7^x - 6x^2\cdot 7^x\ln 7}{7^{2x}}$$

15.10 8)

$$\frac{\left(\sqrt{x}\right)'4e^x - \sqrt{x}\left(4e^x\right)'}{\left(4e^x\right)^2} = \frac{\frac{\cancel{4}^{2}e^x}{\cancel{2}\sqrt{x}} - 4\sqrt{x}\cdot e^x}{16e^{2x}}$$

15.10 9)

$$\frac{\left(x^5\right)'\varepsilon\varphi x - x^5(\varepsilon\varphi x)'}{(\varepsilon\varphi x)^2} = \frac{5x^4\varepsilon\varphi x - \frac{x^5}{\sigma\upsilon\nu^2 x}}{\varepsilon\varphi^2 x}$$

15.10 10)

$$\frac{(2\sigma\upsilon\nu x)'\sqrt{x}-2\sigma\upsilon\nu x\left(\sqrt{x}\right)'}{\left(\sqrt{x}\right)^2}=\frac{-2\eta\mu x\sqrt{x}-\frac{2\sigma\upsilon\nu x}{2\sqrt{x}}}{x}$$

15.10 11)

$$\frac{(\sigma\upsilon\nu x)'\ln x-\sigma\upsilon\nu x(\ln x)'}{(\ln x)^2}=\frac{-\eta\mu x\cdot\ln x-\frac{\sigma\upsilon\nu x}{x}}{\ln^2 x}$$

15.10 12)

$$\frac{\left(\sqrt{x}\right)'4\sigma\varphi x-\sqrt{x}(4\sigma\varphi x)'}{(4\sigma\varphi x)^2}=\frac{\frac{2\cdot 4\sigma\varphi x}{2\sqrt{x}}+\frac{4\sqrt{x}}{\eta\mu^2 x}}{16\sigma\varphi^2 x}$$

15.10 13)

$$\left(\frac{5x^4}{\ln x}\right)'=\frac{\left(5x^4\right)'\ln x-5x^4(\ln x)'}{\ln^2 x}=\frac{20x^3\ln x-5x^{4^3}\frac{1}{x}}{\ln^2 x}=\frac{20x^3\ln x-5x^3}{\ln^2 x}$$

15.10 14)

$$\left(\frac{\varepsilon\varphi x}{\sqrt{x}}\right)'=\frac{(\varepsilon\varphi x)'\sqrt{x}-\varepsilon\varphi x\left(\sqrt{x}\right)'}{\sqrt{x}^2}=\frac{\frac{1}{\sigma\upsilon\nu^2 x}\sqrt{x}-\varepsilon\varphi x\frac{1}{2\sqrt{x}}}{\sqrt{x}^2}=\frac{\frac{\sqrt{x}}{\sigma\upsilon\nu^2 x}-\frac{\varepsilon\varphi x}{2\sqrt{x}}}{\sqrt{x}^2}$$

15.10 15)

$$\left(\frac{2x^9}{\sigma\varphi x}\right)'=\frac{\left(2x^9\right)'\sigma\varphi x-2x^9(\sigma\varphi x)'}{\sigma\varphi^2 x}=\frac{18x^8\sigma\varphi x-2x^9\left(-\frac{1}{\eta\mu^2 x}\right)}{\sigma\varphi^2 x}=\frac{18x^8\sigma\varphi x+\frac{2x^9}{\eta\mu^2 x}}{\sigma\varphi^2 x}$$

15.10 16)

$$\left(\frac{\eta\mu x}{8^x}\right)'=\frac{(\eta\mu x)'8^x-\eta\mu x\left(8^x\right)'}{\left(8^x\right)^2}=\frac{\sigma\upsilon\nu x\cdot 8^x-8^x\ln 8\eta\mu x}{8^{2x}}$$

15.10 17)

$$\left(\frac{\sigma\upsilon\nu x}{e^x}\right)'=\frac{(\sigma\upsilon\nu x)'e^x-\sigma\upsilon\nu x\left(e^x\right)'}{\left(e^x\right)^2}=\frac{-\eta\mu x\cdot e^x-\sigma\upsilon\nu x\cdot e^x}{e^{2x}}$$

15.10 18)

$$\left(\frac{3^x}{\sigma\upsilon\nu x}\right)'=\frac{\left(3^x\right)'\sigma\upsilon\nu x-3^x(\sigma\upsilon\nu x)'}{\sigma\upsilon\nu^2 x}=\frac{3^x\ln 3\cdot\sigma\upsilon\nu x-3^x(-\eta\mu x)}{\sigma\upsilon\nu^2 x}=\frac{3^x\ln 3\cdot\sigma\upsilon\nu x+3^x\eta\mu x}{\sigma\upsilon\nu^2 x}$$

15.10 19)

$$\left(\frac{\sigma\upsilon\nu x}{x^3}\right)'=\frac{(\sigma\upsilon\nu x)'x^3-\sigma\upsilon\nu x\left(x^3\right)'}{\left(x^3\right)^2}=\frac{(-\eta\mu x)x^3-3x^2\sigma\upsilon\nu x}{x^6}=\frac{-x^3\eta\mu x-3x^2\sigma\upsilon\nu x}{x^6}$$

15.10 20)

$$\left(\frac{\eta\mu x}{x+e^x}\right)'=\frac{(\eta\mu x)'(x+e^x)-\eta\mu x(x+e^x)'}{(x+e^x)^2}=\frac{\sigma\upsilon\nu x(x+e^x)-\eta\mu x(1+e^x)}{(x+e^x)^2}$$

15.10 21)

$$\left(\frac{x^2}{x+1}\right)'=\frac{(x^2)'(x+1)-x^2(x+1)'}{(x+1)^2}=\frac{2x(x+1)-x^2}{(x+1)^2}=\frac{2x^2+2x-x^2}{(x+1)^2}=\frac{x^2+2x}{(x+1)^2}$$

15.10 22)

$$\left(\frac{x^2+5x+9}{\ln x}\right)'=\frac{(x^2+5x+9)'\ln x-(x^2+5x+9)(\ln x)'}{\ln^2 x}=$$

$$=\frac{(2x+5)\ln x-(x^2+5x+9)\frac{1}{x}}{\ln^2 x}$$