15.8 1)

α) $\left[\left(5\eta\mu x-4x^3\right)\left(4\ln x-3\sigma\varphi x\right)\right]'=$

$=\left(5\eta\mu x-4x^3\right)'\left(4\ln x-3\sigma\varphi x\right)+\left(5\eta\mu x-4x^3\right)\left(4\ln x-3\sigma\varphi x\right)'=$

$=\left(5\sigma\upsilon\nu x-12x^2\right)\left(4\ln x-3\sigma\varphi x\right)+\left(5\eta\mu x-4x^3\right)\left(\frac{4}{x}+\frac{3}{\eta\mu^2 x}\right)$

β) $\left(2x^5e^x-3\sqrt{x}\sigma\upsilon\nu x\right)'=\left(2x^5e^x\right)'-\left(3\sqrt{x}\sigma\upsilon\nu x\right)'=$

$=\left(2x^5\right)'e^x+2x^5\left(e^x\right)'-\left(3\sqrt{x}\right)'\sigma\upsilon\nu x-3\sqrt{x}\left(\sigma\upsilon\nu x\right)'=$

$=10x^4e^x+2x^5e^x-\frac{3}{2\sqrt{x}}\sigma\upsilon\nu x+3\sqrt{x}\eta\mu x$

15.8 2)

$\left[\left(3\eta\mu x-8\sigma\upsilon\nu x\right)\sqrt{x}\right]'=\left(3\eta\mu x-8\sigma\upsilon\nu x\right)'\sqrt{x}+\left(3\eta\mu x-8\sigma\upsilon\nu x\right)\left(\sqrt{x}\right)'=$

$=\left(3\sigma\upsilon\nu x+8\eta\mu x\right)\sqrt{x}+\frac{3\eta\mu x-8\sigma\upsilon\nu x}{2\sqrt{x}}$

15.8 3)

$\left[\left(\ln x-1\right)\left(\frac{1}{x}-\frac{\eta\mu x}{2}\right)\right]'=\left(\ln x-1\right)'\left(\frac{1}{x}-\frac{\eta\mu x}{2}\right)+\left(\ln x-1\right)\left(\frac{1}{x}-\frac{\eta\mu x}{2}\right)'=$

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

15.8 4)

$\left[\left(2\sqrt{x}-3x^4\right)\left(5^x-\varepsilon\varphi x\right)\right]'=\left(2\sqrt{x}-3x^4\right)'\left(5^x-\varepsilon\varphi x\right)+\left(2\sqrt{x}-3x^4\right)\left(5^x-\varepsilon\varphi x\right)'=$

$=\left(\frac{2}{2\sqrt{x}}-12x^3\right)\left(5^x-\varepsilon\varphi x\right)+\left(2\sqrt{x}-3x^4\right)\left(5^x\ln 5-\frac{1}{\sigma\upsilon\nu^2 x}\right)$

15.8 5)

$\left[\left(\frac{1}{x}-\sigma\varphi x\right)\left(5e^x+2\ln x\right)\right]'=\left(\frac{1}{x}-\sigma\varphi x\right)'\left(5e^x+2\ln x\right)+\left(\frac{1}{x}-\sigma\varphi x\right)\left(5e^x+2\ln x\right)'=$

$=\left(-\frac{1}{x^2}+\frac{1}{\eta\mu^2 x}\right)\left(5e^x+2\ln x\right)+\left(\frac{1}{x}-\sigma\varphi x\right)\left(5e^x+\frac{2}{x}\right)$

15.8 6)

$\left(x\ln x+3\eta\mu x\sigma\upsilon\nu x\right)'=\left(x\right)'\ln x+x\left(\ln x\right)'+\left(3\eta\mu x\right)'\sigma\upsilon\nu x+3\eta\mu x\left(\sigma\upsilon\nu x\right)'=$

$=\ln x+\cancel{x}\,\frac{1}{\cancel{x}}+3\sigma\upsilon\nu x\sigma\upsilon\nu x-3\eta\mu x\eta\mu x=\ln x+1+3\sigma\upsilon\nu^2 x-3\eta\mu^2 x$

15.8 7)

$\left(5e^x\varepsilon\varphi x-4x^2\ln x\right)'=\left(5e^x\right)'\varepsilon\varphi x+5e^x\left(\varepsilon\varphi x\right)'-\left(4x^2\right)'\ln x-4x^2\left(\ln x\right)'=$

$$= 5e^x \varepsilon\varphi x + 5e^x \frac{1}{\sigma\upsilon\nu^2 x} - 8x\ln x - 4x^{\cancel{2}} \frac{1}{\cancel{x}} = 5e^x \varepsilon\varphi x + \frac{5e^x}{\sigma\upsilon\nu^2 x} - 8x\ln x - 4x$$

15.8 8)

$$\left(x^2 \sigma\varphi x - 4x^3 e^x\right)' = \left(x^2\right)' \sigma\varphi x + x^2 \left(\sigma\varphi x\right)' - \left(4x^3\right)' e^x - 4x^3 \left(e^x\right)' =$$

$$= 2x\sigma\varphi x - x^2 \frac{1}{\eta\mu^2 x} - 12x^2 e^x - 4x^3 e^x = 2x\sigma\varphi x - \frac{x^2}{\eta\mu^2 x} - 12x^2 e^x - 4x^3 e^x$$

15.8 9)

$$\left[\left(6x^2 + 11\right)\eta\mu x - \left(x^2 + 8\right)\sigma\upsilon\nu x\right]' =$$

$$= \left(6x^2 + 11\right)' \eta\mu x + \left(6x^2 + 11\right)\left(\eta\mu x\right)' - \left(x^2 + 8\right)' \sigma\upsilon\nu x - \left(x^2 + 8\right)\left(\sigma\upsilon\nu x\right)' =$$

$$= 12x\eta\mu x + \left(6x^2 + 11\right)\sigma\upsilon\nu x - 2x\sigma\upsilon\nu x + \left(x^2 + 8\right)\eta\mu x$$

15.8 10)

$$\left[\left(3e^x - \frac{5}{x}\right)\ln x - \left(x^3 - x\right)\eta\mu x\right]' =$$

$$= \left(3e^x - \frac{5}{x}\right)' \ln x + \left(3e^x - \frac{5}{x}\right)\left(\ln x\right)' - \left(x^3 - x\right)' \eta\mu x - \left(x^3 - x\right)\left(\eta\mu x\right)' =$$

$$= \left(3e^x + \frac{5}{x^2}\right)\ln x + \left(3e^x - \frac{5}{x}\right)\frac{1}{x} - \left(3x^2 - 1\right)\eta\mu x - \left(x^3 - x\right)\left(\sigma\upsilon\nu x\right)$$

15.8 11)

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

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

$$= \left(\frac{1}{\sigma\upsilon\nu^2 x} + \frac{1}{\eta\mu^2 x}\right)\sqrt{x} + \left(\varepsilon\varphi x - \sigma\varphi x\right)\frac{1}{2\sqrt{x}} - \left(5x^4 - 2\right)\sigma\upsilon\nu x + \left(x^5 - 2x\right)\eta\mu x =$$

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

15.8 12)

$$\left(\frac{x^5}{5} - 8x^3 \ln x\right)' = \left(\frac{x^5}{5}\right)' - \left(8x^3 \ln x\right)' = \frac{\cancel{5}x^4}{\cancel{5}} - \left(8x^3\right)' \ln x - 8x^3 \left(\ln x\right)' =$$

$$= x^4 - 24x^2 \ln x - 8x^{\cancel{2}} \frac{1}{\cancel{x}} = x^4 - 24x^2 \ln x - 8x^2$$

15.8 13)

$$\left[6\varepsilon\varphi x + \left(\frac{x^2}{3} - 1\right)\sqrt{x}\right]' = \left(6\varepsilon\varphi x\right)' + \left[\left(\frac{x^2}{3} - 1\right)\sqrt{x}\right]' =$$

$$= \frac{6}{\sigma\upsilon\nu^2 x} + \left(\frac{x^2}{3} - 1\right)' \sqrt{x} + \left(\frac{x^2}{3} - 1\right)\left(\sqrt{x}\right)' = \frac{6}{\sigma\upsilon\nu^2 x} + \frac{2x}{3}\sqrt{x} + \left(\frac{x^2}{3} - 1\right)\frac{1}{2\sqrt{x}}$$

15.8 14)

$$\left[\left(\frac{x^4}{4}-3x\right)7^x+5\sigma\varphi x\right]'=\left[\left(\frac{x^4}{4}-3x\right)7^x\right]'+\left(5\sigma\varphi x\right)'=$$

$$=\left(\frac{x^4}{4}-3x\right)'7^x+\left(\frac{x^4}{4}-3x\right)\left(7^x\right)'-\frac{5}{\eta\mu^2x}=\left(\frac{4x^3}{4}-3\right)7^x+\left(\frac{x^4}{4}-3x\right)7^x\ln 7-\frac{5}{\eta\mu^2x}=$$

$$=\left(x^3-3\right)7^x+\left(\frac{x^4}{4}-3x\right)7^x\ln 7-\frac{5}{\eta\mu^2x}$$

15.8 15)

$$\left[\frac{1}{x}\sigma\varphi x-\left(\frac{x^3}{3}-\ln x\right)\eta\mu x\right]'=$$

$$=\left(\frac{1}{x}\right)'\sigma\varphi x+\frac{1}{x}\left(\sigma\varphi x\right)'-\left(\frac{x^3}{3}-\ln x\right)'\eta\mu x-\left(\frac{x^3}{3}-\ln x\right)\left(\eta\mu x\right)'=$$

$$=-\frac{1}{x^2}\sigma\varphi x-\frac{1}{x}\frac{1}{\eta\mu^2x}-\left(\frac{3x^2}{3}-\frac{1}{x}\right)\eta\mu x-\left(\frac{x^3}{3}-\ln x\right)\sigma\upsilon\nu x=$$

$$=-\frac{\sigma\varphi x}{x^2}-\frac{1}{x\eta\mu^2x}-\left(x^2-\frac{1}{x}\right)\eta\mu x-\left(\frac{x^3}{3}-\ln x\right)\sigma\upsilon\nu x$$