

a)

$$3^{-2} * 3^{-3} * 9^2 = 3^{-2-3} * (3^2)^2 = 3^{-5+4} = 3^{-1} = \frac{1}{3}$$

b)

$$\begin{aligned}(2^{-4}; 2^{-6})^{-1} - (2^{-4} - 2^{-3})^{-1} &= (2^{-4-6})^{-1} - (2^{-3} * 2^{-1} - 2^{-3})^{-1} = 2^{10} - 2^3 * (2^{-1} - 1)^{-1} \\ &= 2^{10} - 2^3 * \left(\frac{1}{2} - 1\right)^{-1} = 2^{10} - 2^3 * \left(-\frac{1}{2}\right)^{-1} = 2^{10} - 2^3 * (-2)^1 = 2^{10} + 2^4 \\ &= 1024 + 16 = 1040\end{aligned}$$

c)

$$(4^3 * 2^{-8}) : (8^3 * 4^{-2})^{-1} = (2^6 * 2^{-8}) : (2^9 * 2^{-4})^{-1} = (2^{-2}) : (2^5)^{-1} = 2^{-2} : 2^{-5} = 2^{-2-(-5)} = 2^3 = 8$$

Zad 4

a)

$$\frac{2^{-2}}{3^{-3}} * \left(\frac{4}{9}\right)^2 = \frac{2^{-2}}{3^{-3}} * \left(\left(\frac{2}{3}\right)^2\right)^2 = \frac{2^{-2}}{3^{-3}} * \frac{2^4}{3^4} = \frac{2^2}{3^1} = \frac{4}{3}$$

b)

$$\left(\left(\frac{2}{3}\right)^{-2}\right)^{-2} = \left(\frac{2}{3}\right)^4 = \frac{16}{81}$$

c)

$$\frac{6^0 + 0^6}{6^{-1}} = \frac{1 + 0}{\frac{1}{6}} = 1 * \frac{6}{1} = 6$$

d)

$$\begin{aligned}\left(\left(\frac{1}{3}\right)^4 * \left(\frac{2}{3}\right)^{-5}\right) : 6^{-2} &= \left(\frac{1^4 * 2^{-5}}{3^4 * 3^{-5}}\right) : (2 * 3)^{-2} = \left(\frac{2^{-5}}{3^{-1}}\right) : \frac{1}{(2 * 3)^2} = \frac{2^{-5}}{3^{-1}} * (2 * 3)^2 = \frac{2^{-5} * 2^2 * 3^2}{3^{-1}} \\ &= 2^{-5+2} * 3^{2-(-1)} = 2^{-3} * 3^3 = \left(\frac{3}{2}\right)^3 = \frac{27}{8}\end{aligned}$$

e)

$$(0.5 * 8^6 - 2 * 16^4) : 7^3 = (2^{-1} * 2^{18} - 2 * 2^{16}) : 7^3 = (2^{17} - 2^{17}) : 7^3 = 0 : 7^3 = 0$$

f)

$$\begin{aligned}\left(\left(\frac{5}{2}\right)^3:\left(\frac{2}{5}\right)^2\right)*\left(\frac{5}{2}\right)^{-4}&=\left(\left(\frac{5}{2}\right)^3:\left(\frac{5}{2}\right)^{-2}\right)*\left(\frac{5}{2}\right)^{-4}=\left(\left(\frac{5}{2}\right)^{3-(-2)}\right)*\left(\frac{5}{2}\right)^{-4}=\left(\frac{5}{2}\right)^5*\left(\frac{5}{2}\right)^{-4}\\&=\left(\frac{5}{2}\right)^{5-4}=\frac{5}{2}\end{aligned}$$