66. $\sqrt{\frac{(1+a)\sqrt[3]{1+a}}{3a}}\sqrt[3]{\frac{\sqrt{3}}{9+18a^{-1}+9a^{-2}}} =$

$$\left(\frac{(1+a)\cdot(1+a)^{\frac{1}{3}}}{3a}\right)^{\frac{1}{2}} \cdot \left(\frac{3^{\frac{1}{2}}}{9\left(1+2\cdot\frac{1}{a}+\left(\frac{1}{a}\right)^2\right)}\right)^{\frac{1}{3}} =$$

$$\frac{\left((1+a)^{\frac{4}{3}}\right)^{\frac{1}{2}}}{(3a)^{\frac{1}{2}}} \cdot \frac{(3^{\frac{1}{2}})^{\frac{1}{3}}}{\left(3^2\cdot\left(1+\frac{1}{a}\right)^2\right)^{\frac{1}{3}}} =$$

$$\frac{(1+a)^{\frac{2}{3}}\cdot 3^{\frac{1}{6}}\cdot a^{\frac{2}{3}}}{3^{\frac{1}{2}}\cdot a^{\frac{1}{2}}\cdot 3^{\frac{2}{3}}\cdot\left(1+\frac{1}{a}\right)^{\frac{2}{3}}\cdot a^{\frac{2}{3}}} =$$

$$= \frac{(1+a)^{\frac{2}{3}}\cdot 3^{\frac{1}{6}}\cdot a^{\frac{2}{3}}}{3^{\frac{3}{6}+\frac{4}{6}}\cdot a^{\frac{1}{2}}\cdot\left(a+1\right)^{\frac{2}{3}}} =$$

$$= 3^{\frac{1}{6}-\frac{7}{6}}\, a^{\frac{2}{3}-\frac{1}{2}} = 3^{-1}\cdot a^{\frac{1}{6}} = \frac{\sqrt[6]{a}}{3}$$

$a^{-1} = \frac{1}{a}$

$a^{-2} = \left(\frac{1}{a}\right)^2$

$a^m \cdot a^l = a^{m+l}$

$a = a^1$

$x^1 \cdot x^{\frac{1}{3}} = x^{1+\frac{1}{3}} = x^{\frac{4}{3}}$

$\left(x^2\right)^{\frac{1}{3}} = x^{\frac{2}{3}}$

$a^n \cdot b^n = (ab)^n$

$\left(\left(1+\frac{1}{a}\right)\cdot a\right)^{\frac{2}{3}}$

$(a+1)^{\frac{2}{3}}$

$\frac{a^m}{a^l} = a^{m-l}$

$a^{-n} = \left(\frac{1}{a}\right)^n = \frac{1}{a^n}$ $\quad (a>0,\ n \in \mathbb{R})$

$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

$\boxed{a^0 = 1}$

$a^{\frac{1}{n}} = \sqrt[n]{a^1} = \sqrt[n]{a}$ $\qquad \sqrt{a} = (a^{\frac{1}{2}})^{\frac{1}{2}}$

$27^{\frac{2}{3}} = \sqrt[3]{27^2} = 3^2 = 9$ $\qquad a^{\frac{1}{4}} = \sqrt[4]{a}$

$\sqrt[3]{\sqrt{a}} = \sqrt{a}^{\frac{1}{3}} = (a^{\frac{1}{2}})^{\frac{1}{3}} = a^{\frac{1}{6}} = \sqrt[6]{a}$

$(2\cdot 3)\cdot 5 = 2\cdot 3\cdot 5 = 30$

$(2+3)\cdot 5 = 2\cdot 5 + 3\cdot 5$

$(a\cdot b)\cdot c = a\cdot b\cdot c = a(b\cdot c)$

$\frac{1}{2}\cdot x = 5 \mid \cdot 2$

$1\cdot x = 10$

65. $\frac{a}{2}\sqrt[4]{(a+1)(a^2-1)(1+2a+a^2)} \cdot \left(\frac{a^2+3a+2}{\sqrt{a-1}}\right)^{-1} =$

$\left(\frac{a}{b}\right)^{-1} = \left(\frac{b}{a}\right)$

$= \frac{a}{2}\sqrt[4]{(a+1)(a-1)(a+1)(a+1)^2} \cdot \frac{\sqrt{a-1}}{(a+1)(a+2)} =$

$= \frac{a}{2}\sqrt[4]{(a+1)^4} \cdot \sqrt[4]{a-1} \cdot \sqrt{a-1} \,/\, (a+1)(a+2) = \frac{a}{2} \cdot (a-1)^{\frac{1}{4}} \cdot (a-1)^{\frac{1}{2}} \,/\, (a+2) = \frac{a(a-1)^{\frac{3}{4}}}{2(a+2)}$