Resolução do Raio-X - MAT9_02NUM09

Resolvas as expressões:

a) $(\sqrt[3]{5} \times \sqrt{7})^6$

$$(\sqrt[3]{5} \times \sqrt{7})^6$$
$$(\sqrt[3]{5} \times \sqrt{7})^6 = \left(5^{\frac{1}{3}} \times 7^{\frac{1}{2}}\right)^6$$
$$\left(5^{\frac{1}{3}} \times 7^{\frac{1}{2}}\right)^6 = 5^{\frac{1}{3}\times 6} \times 7^{\frac{1}{2}\times 6}$$
$$5^{\frac{1}{3}\times 6} \times 7^{\frac{1}{2}\times 6} = 5^2 \times 7^3$$
$$5^2 \times 7^3 = 25 \times 343$$
$$25 \times 343 = 8.575$$
$$(\sqrt[3]{5} \times \sqrt{7})^6 = 8.575$$

b) $\left(\frac{\sqrt[6]{5}}{\sqrt[9]{8}}\right)^3$

$$\left(\frac{\sqrt[6]{5}}{\sqrt[9]{8}}\right)^3$$
$$\left(\frac{\sqrt[6]{5}}{\sqrt[9]{8}}\right)^3 = \left(\frac{5^{\frac{1}{6}}}{8^{\frac{1}{9}}}\right)^3$$
$$\left(\frac{5^{\frac{1}{6}}}{8^{\frac{1}{9}}}\right)^3 = \left(\frac{5^{\frac{1}{6}}}{(2^3)^{\frac{1}{9}}}\right)^3$$
$$\left(\frac{5^{\frac{1}{6}}}{(2^3)^{\frac{1}{9}}}\right)^3 = \left(\frac{5^{\frac{1}{6}}}{2^{\frac{3}{9}}}\right)^3$$
$$\left(\frac{5^{\frac{1}{6}}}{2^{\frac{3}{9}}}\right)^3 = \frac{5^{\frac{1}{6}\times 3}}{2^{\frac{3}{9}\times 3}}$$
$$\frac{5^{\frac{1}{6}\times 3}}{2^{\frac{3}{9}\times 3}} = \frac{5^{\frac{1}{2}}}{2^1}$$
$$\frac{5^{\frac{1}{2}}}{2^1} = \frac{\sqrt{5}}{2}$$

c) $(2^{\frac{1}{3}})^2 \times (3^{\frac{1}{6}})^4$

$$(2^{\frac{1}{3}})^2 \times (3^{\frac{1}{6}})^4 = 2^{\frac{1}{3}\times 2} \times 3^{\frac{1}{6}\times 4}$$

$$2^{\frac{1}{3}\times 2} \times 3^{\frac{1}{6}\times 4} = 2^{\frac{2}{3}} \times 3^{\frac{2}{3}}$$

$$2^{\frac{2}{3}} \times 3^{\frac{2}{3}} = (2 \times 3)^{\frac{2}{3}}$$

$$(2 \times 3)^{\frac{2}{3}} = 6^{\frac{2}{3}}$$

$$6^{\frac{2}{3}} = \sqrt[3]{6^2}$$

$$(2^{\frac{1}{3}})^2 \times (3^{\frac{1}{6}})^4 = \sqrt[3]{6^2}$$

d) $(\frac{8^{\frac{1}{9}}}{9^{\frac{3}{4}}})^2$

$$\left(\frac{8^{\frac{1}{9}}}{9^{\frac{3}{4}}}\right)^2 = \left(\frac{(2^3)^{\frac{1}{9}}}{(3^2)^{\frac{3}{4}}}\right)^2$$

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

$$\left(\frac{2^{\frac{1\times 3}{9}}}{3^{\frac{3\times 2}{4}}}\right)^2 = \frac{2^{\frac{3\times 2}{9}}}{3^{\frac{6\times 2}{4}}}$$

$$\frac{2^{\frac{3\times 2}{9}}}{3^{\frac{6\times 2}{4}}} = \frac{2^{\frac{2}{3}}}{3^3}$$

$$\frac{2^{\frac{2}{3}}}{3^3} = \frac{\sqrt[3]{2^2}}{27}$$

$$\left(\frac{8^{\frac{1}{9}}}{9^{\frac{3}{4}}}\right)^2 = \frac{\sqrt[3]{2^2}}{27}$$