

Potências e raízes

1. (PUC-RJ) O valor de $\frac{\sqrt{1,7777\dots}}{\sqrt{0,1111\dots}}$ é

- a) 4,444... b) 4 c) 4,777... d) 3 e) $\frac{4}{3}$

$$\frac{\sqrt{1 + \frac{7}{9}}}{\sqrt{\frac{1}{9}}} = \frac{\sqrt{\frac{16}{9}}}{\sqrt{\frac{1}{9}}} = \frac{\frac{4}{3}}{\frac{1}{3}} = \frac{4}{3} \cdot \frac{3}{1} = 4$$

2. (UF-MG) O quociente $(7\sqrt{3} - 5\sqrt{48} + 2\sqrt{192}) \div 3\sqrt{3}$ é igual a:

- a) $3\sqrt{3}$ b) $2\sqrt{3}$ c) $\frac{\sqrt{3}}{3}$ d) 2 e) 1

$$(7\sqrt{3} - 5\sqrt{16 \cdot 3} + 2\sqrt{8^2 \cdot 3}) \div 3\sqrt{3}$$

$$(7\sqrt{3} - 5 \cdot 4\sqrt{3} + 2 \cdot 8\sqrt{3}) \div 3\sqrt{3}$$

$$(7\sqrt{3} - 20\sqrt{3} + 16\sqrt{3}) \div 3\sqrt{3}$$

$$(23 - 20)\sqrt{3} \div 3\sqrt{3}$$

$$3\sqrt{3} \div 3\sqrt{3} = 1.$$

3) (UF-RN) $\sqrt{13 + \sqrt{7 + \sqrt{2 + \sqrt{4}}}}$ é igual a:

- a) 4 b) 5 c) 6 d) 7 e) 8

$$\sqrt{13 + \sqrt{7 + \sqrt{2 + 2}}} = \sqrt{13 + \sqrt{7 + \sqrt{4}}} = \sqrt{13 + \sqrt{7 + 2}} = \sqrt{13 + \sqrt{9}} = \sqrt{13 + 3} = \sqrt{16} = 4.$$

4) (PUC-PR) A expressão $\sqrt{27 - 10\sqrt{2}}$ é igual a:

- a) $3\sqrt{2} - 5$ b) $3 - 5\sqrt{2}$ c) $9 - 2\sqrt{2}$ d) $6 - \sqrt{2}$ ~~e) $5 - \sqrt{2}$~~

$$\sqrt{27 - 10\sqrt{2}} = \sqrt{25 + 2 - 10\sqrt{2}} = \sqrt{25 - 2 \cdot 5\sqrt{2} + 2} =$$

$$= \sqrt{(\sqrt{25} - \sqrt{2})^2} = 5 - \sqrt{2}.$$

5) (U. F. Lavras-MG) O valor da expressão $\left[\frac{\frac{1}{5} - \frac{1}{3} + \frac{1}{2} \cdot \frac{4}{5}}{\frac{0,6}{0,5} - 0,4} \right]^{-\frac{1}{3}} \cdot \sqrt[3]{9}$ é

- a) $\frac{2}{3}$ b) $\sqrt[3]{3}$ c) 3 d) $\frac{5}{8}$ e) $\frac{1}{\sqrt[3]{3}}$

$$\left[\frac{\frac{1}{5} - \frac{1}{3} + \frac{4}{10}}{\frac{6}{5} - \frac{4}{10}} \right]^{-\frac{1}{3}} = \left[\frac{\frac{6 - 10 + 12}{30}}{\frac{12 - 4}{10}} \right]^{-\frac{1}{3}} = \left[\frac{\frac{8}{30}}{\frac{8}{10}} \right]^{-\frac{1}{3}} = \left[\frac{\frac{8}{10}}{\frac{8}{30}} \right]^{\frac{1}{3}}$$

$$= \left(\frac{8}{10} \cdot \frac{30}{8} \right)^{\frac{1}{3}} = \left(\frac{30}{10} \right)^{\frac{1}{3}} = 3^{\frac{1}{3}} = \sqrt[3]{3} .$$

6) (EPCAR) O valor da expressão $\left[\frac{(6,25 \cdot 10^{-2})^{\frac{1}{4}}}{(6,4 \cdot 10^{-2})^{-\frac{1}{3}}} \right]^{-\frac{1}{2}}$ é

a) $\sqrt{5}$

b) $\frac{\sqrt{5}}{5}$

c) $\sqrt{3}$

d) $\sqrt{7}$

$$\left[\frac{\left(\frac{625}{100} \cdot \frac{1}{100} \right)^{\frac{1}{4}}}{\left(\frac{64}{10} \cdot \frac{1}{100} \right)^{-\frac{1}{3}}} \right]^{-\frac{1}{2}} = \left[\frac{\left(\frac{625}{10.000} \right)^{\frac{1}{4}}}{\left(\frac{64}{1000} \right)^{-\frac{1}{3}}} \right]^{-\frac{1}{2}} = \left[\frac{\sqrt[4]{\frac{625}{10.000}}}{\sqrt[3]{\frac{1000}{64}}} \right]^{-\frac{1}{2}}$$

$$\left[\frac{\frac{5}{10}}{\frac{10}{4}} \right]^{-\frac{1}{2}} = \left[\frac{5}{10} \cdot \frac{4}{10} \right]^{-\frac{1}{2}} = \left(\frac{20}{100} \right)^{-\frac{1}{2}} = \left(\frac{1}{5} \right)^{-\frac{1}{2}}$$

$$(5)^{\frac{1}{2}} = \sqrt{5} .$$

7) (EPCAR) A diferença $8^{0,666\dots} - 9^{0,5}$ é igual a:

a) -2

b) $\sqrt{2} - 3$

c) $-2\sqrt{2}$

d) 1

$$8^{\frac{2}{3}} - 9^{\frac{1}{2}}$$

$$8^{\frac{2}{3}} - 9^{\frac{1}{2}}$$

$$\sqrt[3]{8^2} - \sqrt{9}$$

$$\sqrt[3]{64} - 3$$

$$4 - 3 = 1$$

8) (EPCAR) Ao resolver a expressão numérica

$$\sqrt[3]{\frac{(25 \cdot 10^{-6}) \cdot 0,000075}{10}} \div \frac{5\sqrt[3]{1,5}}{10^4} \cdot (-0,0010)^0, \text{ o valor}$$

encontrado é:

- a) $\sqrt[3]{2}$
- b) $\sqrt[3]{3}$
- c) 1
- d) 0,1

$$\sqrt[3]{\frac{25 \cdot 10^{-6} \cdot 75 \cdot 10^{-6}}{10}} \div \frac{5 \sqrt[3]{\frac{3}{2}}}{10^4}$$

$$= \sqrt[3]{\frac{25 \cdot 75 \cdot 10^{-12}}{10}} \div \frac{5 \sqrt[3]{\frac{3}{2}}}{10^4}$$

$$\sqrt[3]{\frac{125 \cdot 15 \cdot 10^{-12}}{10}} \div \frac{5 \sqrt[3]{\frac{3}{2}}}{10^4}$$

$$\frac{5}{10^4} \sqrt[3]{\frac{15}{10}} \div \frac{5}{10^4} \sqrt[3]{\frac{3}{2}}$$

$$\sqrt[3]{\frac{3}{2}} \div \sqrt[3]{\frac{3}{2}} = 1.$$

9) (C. Naval) Resolvendo-se a expressão:

$$x = \frac{8^{0,666\dots} + 4^{3/2} + 2\sqrt{9} + 9^{0,5}}{\left(\frac{1}{49}\right)^{-1/2}}, \text{ encontra-se:}$$

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

$$8^{2/3} + 4^{3/2} + 2 \cdot 3 + 9^{1/2}$$

$$\frac{8^{2/3} + 4^{3/2} + 6 + \sqrt{9}}{\sqrt{49}}$$

$$\frac{\sqrt[3]{8^2} + \sqrt{4^3} + 6 + 3}{7}$$

$$\frac{2^2 + 2^3 + 6 + 3}{7} = \frac{4 + 8 + 6 + 3}{7} = \frac{21}{7} = 3.$$