RADICIAÇÃO

01.

a) $8^{2/3} = \sqrt[3]{8^2} = \sqrt[3]{64} = 4$

b) $\sqrt{(-4)^2} = \sqrt{16} = 4$ ou -4

c) $\sqrt[3]{-8} = -2$

d) $-\sqrt[4]{81} = -3$

02.

$\sqrt{\sqrt{6}-2} \cdot \sqrt{2+\sqrt{6}} = A$

$\left(\sqrt{(\sqrt{6}-2)\cdot(2+\sqrt{6})}\right)^2 = A^2$

$(\sqrt{6}-2)\cdot(\sqrt{6}+2) = A^2$

$(\sqrt{6})^2 - (2)^2 = A^2$

$6 - 4 = A^2$ 　Ⓑ

$A^2 = 2$

03. $x = \sqrt{8} + \sqrt{64} - 5\sqrt{2}$

$x = 2\sqrt{2} + 8 - 5\sqrt{2}$

$x = 8 - 3\sqrt{2}$

04. $\dfrac{\sqrt{100}-\sqrt{5}}{\sqrt{3}\cdot\sqrt{50}} = \dfrac{10-\sqrt{5}}{\sqrt{3}\cdot 5\cdot\sqrt{2}} = \dfrac{10-\sqrt{5}}{5\sqrt{6}}\cdot\dfrac{\sqrt{6}}{\sqrt{6}} = \dfrac{10\sqrt{6}-\sqrt{30}}{5\cdot 6} = \dfrac{10\sqrt{6}-\sqrt{30}}{30}$

05. $\sqrt{x} = 45$ 　　 $0{,}75 \cdot y = 2025$

$x = 45^2$ 　　　　 $y = \dfrac{2025}{0{,}75} = 2700$

$x = 2025$ 　　　 Ⓐ

$$= \frac{3}{4} + \frac{1}{4+2}$$

$$= \frac{3}{4} + \frac{1}{6} =$$

$$= \frac{9+2}{12} = \frac{11}{12}$$

07. $\sqrt{\sqrt[3]{8} - \sqrt{25} + \sqrt{\sqrt{625}}} =$

$= \sqrt{2 - 5 + \sqrt{25}} =$

$= \sqrt{2 - 5 + 5} =$

$= \sqrt{2}$

08. a) 9

b) 4

c) 13

d) 4

e) 3

f) 2

09. a) $\sqrt{16} + \sqrt{36} = 4 + 6 = 10$

b) $\sqrt{25} + \sqrt{9} = 5 + 3 = 8$

c) $\sqrt{49} - \sqrt{4} = 7 - 2 = 5$

d) $\sqrt{36} - \sqrt{1} = 6 - 1 = 5$

e) $\sqrt{9} + \sqrt{100} = 3 + 10 = 13$

f) $\sqrt{4} \cdot \sqrt{9} = 2 \cdot 3 = 6$

10. $x^2 = 196$

$x = \sqrt{196}$

$x = 14 \, m$ Ⓒ

11. $\sqrt[3]{7 + \sqrt{3 - \sqrt{1 + \sqrt{9}}}} =$

12. $\sqrt{19 + \sqrt{32 + \sqrt{14 + \sqrt{1 + \sqrt{9}}}}}$

$$= 3\sqrt{7 + \sqrt{3 - \sqrt{1 + 3}}} =$$

$$= 3\sqrt{7 + \sqrt{3 - \sqrt{4}}} =$$ Ⓓ

$$= \sqrt[3]{7 + \sqrt{3 - 2}} =$$

$$= \sqrt[3]{7 + \sqrt{1}} =$$

$$= \sqrt[3]{7 + 1} =$$

$$= \sqrt[3]{8} = 2$$

$$= \sqrt{19 + \sqrt{32 + \sqrt{14 + \sqrt{1 + 3}}}} =$$

$$= \sqrt{19 + \sqrt{32 + \sqrt{14 + \sqrt{4}}}} =$$

$$= \sqrt{19 + \sqrt{32 + \sqrt{14 + 2}}} =$$

$$= \sqrt{19 + \sqrt{32 + \sqrt{16}}} =$$

$$= \sqrt{19 + \sqrt{32 + 4}} =$$

$$= \sqrt{19 + \sqrt{36}} =$$

$$= \sqrt{19 + 6} =$$ Ⓑ

$$= \sqrt{25} =$$

$$= 5$$

13. $\sqrt{50} - \sqrt{18} + \sqrt{98} =$

$$= \sqrt{25 \cdot 2} - \sqrt{9 \cdot 2} + \sqrt{49 \cdot 2} =$$

$$= 5\sqrt{2} - 3\sqrt{2} + 7\sqrt{2} =$$

$$= 12\sqrt{2} - 3\sqrt{2} =$$

$$= 9\sqrt{2}$$

14. $x^2 = \left(\sqrt{(3 + \sqrt{5})} + \sqrt{(3 - \sqrt{5})} \right)^2$

$x^2 = (3 + \sqrt{5}) + 2 \cdot \sqrt{(3 + \sqrt{5})(3 - \sqrt{5})} + (3 - \sqrt{5})$

$x^2 = 3 + \cancel{\sqrt{5}} + 3 - \cancel{\sqrt{5}} + 2 \cdot \sqrt{3^2 - 5}$

$x^2 = 6 + 2 \cdot \sqrt{9 - 5}$

$x^2 = 6 + 2 \cdot 2$

$x^2 = 10$

$$\frac{x^2}{5} = \frac{10}{5} = 2$$

15. $\dfrac{1}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\sqrt{2}}{2}$

$\dfrac{1}{1+\sqrt{2}} \cdot \dfrac{(1-\sqrt{2})}{(1-\sqrt{2})} = \dfrac{1-\sqrt{2}}{1-2} = \dfrac{1-\sqrt{2}}{-1} \cdot \dfrac{(-1)}{\cdot(-1)} = \dfrac{\sqrt{2}-1}{1}$

$\dfrac{1}{2+\sqrt{2}} \cdot \dfrac{(2-\sqrt{2})}{(2-\sqrt{2})} = \dfrac{2-\sqrt{2}}{4-2} = \dfrac{2-\sqrt{2}}{2}$

$\dfrac{\sqrt{2}}{2} - (\sqrt{2}-1) - \left(\dfrac{2-\sqrt{2}}{2} \right) =$

$= \dfrac{\sqrt{2}}{2} - \sqrt{2} + 1 - \dfrac{2}{2} + \dfrac{\sqrt{2}}{2} =$

$= \dfrac{\sqrt{2}}{2} + \dfrac{\sqrt{2}}{2} - \sqrt{2} + 1 - 1 =$

$= \dfrac{2\sqrt{2}}{2} - \sqrt{2} =$

$= \sqrt{2} - \sqrt{2} = 0$

16. $\sqrt[4]{5} \cdot \sqrt{5} \cdot \sqrt[4]{5} \cdot \sqrt[3]{5} =$

$= 5^{1/4} \cdot 5^{1/2} \cdot 5^{1/4} \cdot 5^{1/3} =$

$= 5^{1/4 + 1/2 + 1/4 + 1/3} =$

$= 5^{1 + 1/3} =$

$= 5 \cdot 5^{1/3} =$

$= 5 \cdot \sqrt[3]{5}$

17. $\dfrac{1}{m} + \dfrac{1}{n} = 1$

$\dfrac{1}{5-\sqrt{3}} \cdot \dfrac{22}{5-\sqrt{3}} \cdot \dfrac{(5+\sqrt{3})}{(5+\sqrt{3})} = \dfrac{22 \cdot (5+\sqrt{3})}{5^2 - 3} = \dfrac{22 \cdot (5+\sqrt{3})}{25 - 3} =$

$$= \frac{\cancel{2x} \cdot (5+\sqrt{3})}{\cancel{2x}} = 5+\sqrt{3}$$

$$5+\sqrt{3}+\frac{1}{n} = 1 \qquad (-4-\sqrt{3}) \cdot n = 1 \quad \cdot (-1)$$

$$\qquad\qquad\qquad\qquad (4+\sqrt{3}) \cdot n = -1$$

$$\frac{1}{n} = 1-5-\sqrt{3} \qquad\qquad n = \frac{-1}{4+\sqrt{3}} \cdot \frac{(4-\sqrt{3})}{(4-\sqrt{3})}$$

$$n = \frac{-4+\sqrt{3}}{16-3}$$

$$n = \frac{-4+\sqrt{3}}{13}$$

(A)

18 (I). $(2\sqrt{4.2} - 3\sqrt{2})^3 =$

$\quad = (2 \cdot 2\sqrt{2} - 3\sqrt{2})^3$

$\quad = (4\sqrt{2} - 3\sqrt{2})^3$

$\quad = (\sqrt{2})^3$ ✓

$\quad = (\sqrt{2})^2 \cdot \sqrt{2} =$

$\quad = 2\sqrt{2}$

(II). $5\sqrt{8} = 5 \cdot \sqrt{4.2} = 5 \cdot 2\sqrt{2} = 10\sqrt{2}$ ✗

$10\sqrt{2}$ é menor que $11\sqrt{2}$

(III). $(6\sqrt{3})^2 = 36 \cdot 3 = 108$ ✓

(B)

19. $(\sqrt{3}-\sqrt{5})^2 + (\sqrt{3}+\sqrt{5})^2 + (\sqrt{3}-\sqrt{5})(\sqrt{3}+\sqrt{5}) =$

$= 3 - 2\cancel{\sqrt{3} \cdot \sqrt{5}} + 5 + 3 + 2 \cdot \cancel{\sqrt{3} \cdot \sqrt{5}} + 5 + 3 - 5 =$

$$= 3 + 5 + 3 + 5 + 3 - 5 =$$
$$= 14$$

C

$20.$

$$\sqrt{\frac{x}{y} \cdot \left(\frac{y}{x}\right)^{1/3}} =$$

$$= \sqrt{\left(\frac{y}{x}\right)^{-1} \cdot \left(\frac{y}{x}^{1/3}\right)} =$$

$$= \sqrt{\left(\frac{y}{x}\right)^{-1 + 1/3}} =$$

$$= \sqrt{\left(\frac{y}{x}\right)^{-2/3}} = \left(\frac{y}{x}\right)^{-\frac{2}{3} \cdot \frac{1}{2}} = \left(\frac{y}{x}\right)^{-1/3} = \left(\frac{x}{y}\right)^{1/3} = 3\sqrt{\frac{x}{y}}$$

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