

Exercícios Resolvidos

Folha 1

① Calcule o valor das expressões:

(a) $(-2)^2 + 2^{-1}$

Resposta: $(-2)^2 + 2^{-1} = (-2)(-2) + \frac{1}{2^1} = +4 + \frac{1}{2} = 4 + 0,5 = \boxed{4,5}$

(b) $(-2)^4 \cdot 4^{-2} - (-2)^3$

Resposta: $(-2) \cdot (-2) \cdot (-2) \cdot (-2) \cdot \frac{1}{4^2} - (-2)(-2)(-2) =$

$= (+4) \cdot (+4) \cdot \frac{1}{4 \cdot 4} - (+4)(-2) = 16 \cdot \frac{1}{16} - (-8) =$

$= \frac{16}{16} + 8 = 1 + 8 = \boxed{9}$

(c) $(-2) + (-3) \cdot (-2)^{-1} : (-3)$

Resposta:

$-2 + (-3) \cdot \frac{1}{(-2)^1} : (-3) = -2 + \frac{(-3) : (-3)}{(-2)} =$

$= -2 + \frac{(-3)^{1-1}}{(-2)} = -2 + \frac{(-3)^0}{(-2)} = -2 + \frac{1}{-2} = -2 - \frac{1}{2} =$

$= -2 - 0,5 = \boxed{-2,5}$

(d) $\frac{2^0 + 2^{-1}}{4^{-1}}$

Resposta: $\frac{1 + \frac{1}{2}}{\frac{1}{4}} = \frac{1 + 0,5}{0,25} = \frac{1,5}{0,25} = \frac{150}{25} = \frac{30}{5} =$

$= \boxed{6}$

$$(e) \frac{-2^4 + 3^2 + 2^0}{-2^2 + \left(\frac{1}{3}\right)^{-2}}$$

$$\text{Resposta: } \frac{-2 \cdot 2 \cdot 2 \cdot 2 + 3 \cdot 3 + 1}{-2 \cdot 2 + \left(\frac{3}{1}\right)^{+2}} = \frac{-16 + 9 + 1}{-4 + 3^2} =$$

$$= \frac{-16 + 10}{-4 + 9} = \frac{-6}{+5} = -\frac{6}{5} = \boxed{-1,2}$$

$$(f) \frac{3^0 + (-2)^2 - \left(\frac{1}{3}\right)^{-1}}{\left(\frac{1}{2}\right)^{-2}}$$

$$\text{Resposta: } \frac{1 + (-2)(-2) - \left(\frac{3}{1}\right)^{+1}}{\left(\frac{2}{1}\right)^{+2}} = \frac{1 + 4 - 3}{2^2} =$$

$$= \frac{5 - 3}{4} = \frac{2}{4} = \frac{1}{2} = \boxed{0,5}$$

② A metade de 2^{22} e $8^{\frac{2}{3}} + 9^{0,5}$ correspondem, respectivamente, a:

(a) 2^{11} e 11

(b) 2^{21} e 11

(c) 2^{21} e 7

(d) 2^{11} e 7

(e) 2^{23} e 17

Resposta: ① Metade de 2^{22} ;

$$2^{22} \div 2^1 = 2^{22-1} = \boxed{2^{21}}$$

$$\textcircled{2} 8^{\frac{2}{3}} + 9^{0,5} = \sqrt[3]{8^2} + 9^{\frac{1}{2}} =$$

$$= \sqrt[3]{(2^3)^2} + (3^2)^{\frac{1}{2}} = \sqrt[3]{2^{3 \cdot 2}} + \sqrt{3^2}$$

$$= \sqrt[3]{2^6} + 3^{\frac{2}{2}} = 2^{\frac{6}{3}} + 3^1 = 2^2 + 3 =$$

$$= 2 \cdot 2 + 3 = 4 + 3 = \boxed{7}$$

Resposta: letra (c)

③ Simplifique a expressões:

$$\left(\frac{10^{-3} \cdot (10^3)^4}{10^5} \right)^2 \cdot (10^{-4})^3 = \left(\frac{10^{-3} \cdot 10^{12}}{10^5} \right)^2 \cdot (10^{-12}) =$$

$$= \left(\frac{10^9}{10^5} \right)^2 \cdot (10^{-12}) = (10^4)^2 \cdot (10^{-12}) = 10^{4 \cdot 2} \cdot 10^{-12}$$

$$= 10^8 \cdot 10^{-12} = 10^{8-12} = 10^{-4} = \frac{1}{10^4} = \frac{1}{10000}$$

④ Transforme em produto a expressões:

$$2^{x-2} + 2^{x-1} = 2^x \cdot 2^{-2} + 2^x \cdot 2^{-1} = 2^x \cdot \frac{1}{2^2} + 2^x \cdot \frac{1}{2} =$$

\Rightarrow Fator comum: 2^x .

$$\text{Logo, temos: } 2^x \cdot \frac{1}{2^2} + 2^x \cdot \frac{1}{2} = 2^x \cdot \left(\frac{1}{2^2} + \frac{1}{2} \right) =$$

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

$$= 2^x \cdot (0,25 + 0,5) = \boxed{2^x \cdot 0,75}$$

5) Reescreva a expressões na forma de potência:

$$\boxed{\sqrt{\sqrt[3]{a}}} \Rightarrow \sqrt{\left(a^{\frac{1}{3}}\right)^{\frac{1}{2}}} = \left(a^{\frac{1}{3}}\right)^{\frac{1}{2}} = a^{\frac{1}{3} \cdot \frac{1}{2}} = \boxed{a^{\frac{1}{6}}}$$

$$\begin{aligned} \boxed{\sqrt{a \sqrt[3]{a}}} &= \sqrt{a \cdot a^{\frac{1}{3}}} = \sqrt{a^1} \cdot \sqrt{\left(a^{\frac{1}{3}}\right)^1} = \\ &= a^{\frac{1}{2}} \cdot \left(a^{\frac{1}{3}}\right)^{\frac{1}{2}} = a^{\frac{1}{2}} \cdot a^{\frac{1}{3} \cdot \frac{1}{2}} = a^{\frac{1}{2}} \cdot a^{\frac{1}{6}} = \\ &= \boxed{a^{\frac{1}{2} + \frac{1}{6}}} \end{aligned}$$

6) Calcule o valor da expressões:

$$\boxed{\frac{(10)^{-5} (10^{-2})^2 \cdot 10^3}{10^{-3}}} = \frac{10^{-5} \cdot 10^{-2 \cdot 2} \cdot 10^3}{10^{-3}} =$$

$$= \frac{10^{-5} \cdot 10^{-4} \cdot 10^3}{10^{-3}} = \frac{10^{-5-4+3}}{10^{-3}} = \frac{10^{-6}}{10^{-3}} = 10^{-6-(-3)} =$$

$$= 10^{-6+3} = \boxed{10^{-3}}$$

Folha 6

Revisão das propriedades:

$$* a^5 \cdot a^6 = a^{5+6} = a^{11}$$

$$* a^5 \div a^6 = a^{5-6} = a^{-1}$$

$$* (a^5)^3 = a^{5 \cdot 3} = a^{15}$$

$$* \sqrt[b]{a^x} = a^{\frac{x}{b}}$$

OBS: $(a \cdot b)^n = a^n \cdot b^n$

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

$$\cdot \sqrt[x]{a \cdot b} = \sqrt[x]{a} \cdot \sqrt[x]{b}$$

$$\cdot (1+x)^2 = (1+x)(1+x)$$

$$(y-x)^3 = (y-x)(y-x)(y-x)$$

7) Reduza a uma única potência:

$$(a) 7^4 \cdot 7^2 = 7^{4+2} = 7^6$$

$$(b) 3 \cdot 3^8 = 3^{1+8} = 3^9$$

$$(c) 2^3 \cdot 2^7 \cdot 2^2 = 2^{12}$$

$$(d) 5^9 \div 5^2 = 5^{9-2} = 5^7$$

$$(e) \frac{3^{10}}{3^4} = 3^{10-4} = 3^6$$

$$(f) \frac{a^6}{a} = a^{6-1} = a^5$$

$$(g) (2^5)^3 = 2^{5 \cdot 3} = 2^{15}$$

$$(h) (2^6)^x = 2^{6 \cdot x} = 2^{6x}$$

$$(i) 5^{(2^3)} = 5^{2 \cdot 2 \cdot 2} = 5^8$$

$$(j) 7^{(3^2)} = 7^{3 \cdot 3} = 7^9$$

$$(l) \frac{2^7 \cdot 2^3}{2^{-4}} = \frac{2^{7+3}}{2^{-4}} = \frac{2^{10}}{2^{-4}} = 2^{10 - (-4)} = 2^{10+4} = 2^{14}$$

$$(m) (3^4 \cdot 3^{-2})^2 = (3^4)^2 \cdot (3^{-2})^2 = 3^{4 \cdot 2} \cdot 3^{-2 \cdot 2} = 3^8 \cdot 3^{-4} = 3^{8-4} = 3^4$$

$$(n) (\sqrt{2})^2 = \sqrt{2} \cdot \sqrt{2} = \sqrt{2 \cdot 2} = \sqrt{2^2} = 2^{\frac{2}{2}} = 2^1 = 2$$

$$(o) \sqrt[5]{8} = \sqrt[5]{2^3} = 2^{\frac{3}{5}}$$

$$(p) -\sqrt[5]{8} = -\sqrt[5]{2^3} = -2^{\frac{3}{5}}$$

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

$$(r) 3^{-\frac{1}{2}} = \left(\frac{1}{3}\right)^{\frac{1}{2}} = \sqrt{\frac{1}{3}}$$

$$(s) \sqrt[3]{2^2} = \sqrt[3]{2 \cdot 2} = \sqrt[3]{2} \cdot \sqrt[3]{2} = 2^{\frac{1}{3}} \cdot 2^{\frac{1}{3}} = 2^{\frac{1}{3} + \frac{1}{3}} = 2^{\frac{2}{3}}$$

$$(t) (\sqrt{7})^3 = (\sqrt{7})(\sqrt{7})(\sqrt{7}) = \sqrt{7 \cdot 7 \cdot 7} = \sqrt{7^3} = 7^{\frac{3}{2}}$$