CTA.171.MATI-1

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PROPRIEDADES DAS POTÊNCIAS

$a^m \cdot a^n = a^{m+n}$
$\frac{a^m}{a^n} = a^{m-n}$; com $(a \neq 0)$
$\frac{a^n}{b^n} = \left(\frac{a}{b}\right)^n$, com $(b \neq 0)$
$a^n \cdot b^n = (a \cdot b)^n$
$(a^m)^n = a^{m \cdot n}$

Exercícios de Aula

01. Sendo a e b números reais diferentes de zero, o valor de $\frac{(a^3 \cdot b^2)^3}{(a^2 \cdot b^3)^2}$ é:

(A) a^2b
(B) a^6
(C) a^5
(D) b^4
(E) ab

$\frac{a^9 \cdot b^6}{a^4 \cdot b^6} = a^{9-4} = a^5$

02. O valor da expressão: $\left[\left(-\frac{1}{2}\right)^4 : \left(-\frac{1}{2}\right)^3\right] \cdot \left(-\frac{1}{2}\right)^6 + 2^{-7}$ é:

(A) $\frac{1}{2}$
(B) –1
(C) –2
(D) 2
(E) 0

$\left(-\frac{1}{2}\right)^1 \cdot \left(-\frac{1}{2}\right)^6 + \left(\frac{1}{2}\right)^7$

$\left(-\frac{1}{2}\right)^7 + \left(\frac{1}{2}\right)^7 = -\frac{1}{128} + \frac{1}{128} = 0$

03. Se $a = 2^3$, $b = a^2$, $c = 2^a$, o valor de 2abc é:

(A) 2^{15}
(B) 8^{18}
(C) 2^{18}
(D) 4^{15}
(E) 2^{12}

2Abc

$2 \cdot 2^3 \cdot (2^3)^2 \cdot 2^8 = 2^4 \cdot 2^6 \cdot 2^8 =$

2^{18}

04. O valor de $\frac{10^{-2} \cdot 10^{-3} \cdot 10^{-4}}{10^{-1} \cdot 10^{-6}}$ é:

(A) 1
(B) 0,1
(C)
(D)
(E)

$\frac{10^{-9}}{10^{-7}} = 10^{-9-(-7)} = 10^{-2}$

$\frac{1}{10^2} = \frac{1}{100} = 0,01$

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(C) 0,01
(D) 0,001
(E) 0,0001

05.Provar que $\frac{2^n + 2^{n+1} + 2^{n+2}}{2^{n+3}} = \frac{7}{8}, \forall n \in \mathbb{N}$.

$\frac{2^N + 2^N \cdot 2 + 2^N \cdot 2^2}{2^N \cdot 2^3} = \frac{2^N (1+2+2^2)}{2^N \cdot 2^3} = \frac{1+2+4}{8} = \frac{7}{8}$

Tarefa Básica

01.Sabendo-se que $\left[(3^5)^2 . 3^{5^2}\right] : (3^3)^2 = 3^a$, então:
(A)a = 10
(B)a = 14
(C)a = 19
(D)a = 24
(E)a = 29

$[(3^{10} \cdot 3^{10})] : (3^6) = 3^a = [3^{20}] : (3^6) = 3^a =$
$3^{20-6} = 3^a = 3^{14} = 3^a = 3^a : 3^{14} = \frac{14}{1} = A = 14$

02.Simplificando-se a expressão $[2^9 : (2^2 . 2)^3]^{-3}$, obtém-se:
(A)2^{36}
(B)2^{-36}
(C)2^{-6}
(D)1
(E)$\frac{1}{3}$

$[2^9 : (2^3)^3]^{-3} =$
$[2^9 : 2^9]^{-3} =$
$[1]^3 = 1$

03.O valor numérico da expressão ab^x para a = 1000, b = 100 e x = 0,4 é:
(A)$10 . (100^{2,4})$
(B)1040
(C)$10^{3,8}$
(D)$10^{0,4}$
(E)$100^{3,8}$

$1000 \cdot 100^{0,4} =$
$10^3 \cdot (10^2)^{0,4} =$
$10^3 \cdot 10^{0,8} = 10^{3,8}$

04.A metade de 4^{22} é:
(A) 2^{11}
(B) 2^{22}
(C) 2^{41}
(D) 4^{21}
(E) 2^{43}

$\frac{4^{22}}{2} = (2^2)^{22} = \frac{2^{44}}{2} = 2^{44} : 2^1 = 2^{43}$

05.Calculando $\frac{(0,1).(0,001).10^{-1}}{10.(0,0001)}$, obtemos:

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

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(A) 10^{-1}
(B) 10^{-2}
(C) 10^{2}
(D) 10^{3}
(E) 10^{4}

06. Efetuando a divisão $e^{x} : e^{x-2}$, teremos:
(A) e^{-2}
(B) e^{x^2-2x}
(C) e^{2}
(D) $e^{\frac{x}{x-2}}$
(E) e^{2x}

$E^x : E^{x-2} = E^{x-(x-2)} =$
$E^{x-x+2} = E^2$

07. Se $7^{5y} = 243$, o valor de 7^{-y} é:
(A) $\frac{1}{3}$
(B) $\frac{1}{6}$
(C) $\frac{1}{15}$
(D) $\frac{1}{30}$
(E) $-\frac{1}{3}$

$7^{5.y} = 243$

243	3
81	3
27	3
9	3
3	3
1	

$(7^{-y})^5 = 3^5$
$7^{y} = 3$
$7^{-y} = (1/7)^{y} = 1^{y}/7^{y} = \frac{1}{3}$

08. (MACK) Se $5^x=m$ e $5^y=n$, $(0,04)^{-x+2y}$ vale
(A) $m^{-2}.n^{-4}$
(B) $m^{1/2}.n^{-4}$
(C) $m^{2}.n^{-1/4}$
(D) $m^{-2}.n^{4}$
(E) $m^{2}.n^{-4}$

$(0,04)^{-x+2y} = (4/100)^{-x+2y} = (1/25)^{-x+2y} = (5^{-2})^{-x+2y} = 5^{2x}.5^{-4y} = (5^x)^2.(5^y)^{-4} = m^2.n^{-4}$

09. (UEL) Se x e y são números reais, então
(A) $(3^x)^y=3x^y$ $(3^x)^y = 3^{xy}$ FALSO
(B) $(2^x.3^y)^2 = 2^{2x}.3^{2y}$ $= 2^{2x}.3^{2y}$ VERDADEIRO
(C) $(2^x-3^x)^y=2^{xy}-3^{xy}=-1^{xy}$ $2^{xy}-3^{xy}$ FALSO
(D) $5^x+3^x=8^x$ FALSO NÃO EXISTE PROPRIEDADE PARA A SOMA DE DUAS POTÊNCIAS
(E) $3.2^x=6^x$ FALSO O CORRETO SERIA $3^x.2^x = 6^x$

Respostas da Tarefa Básica

01) (E)
02) (D)
03) (C)
04) (E)
05) (B)
06) (C)
07) (A)
08) (E)
09) (B)