INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA DE SÃO PAULO – CAMPUS CUBATÃO

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Data: 21/07/2021

Turma: CTII 317

TAREFA BÁSICA – TEOREMA DO BINÔMIO

QUESTÕES

01.

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21 . 07 . 21

Tarefa Básica - Teorema do Binômio

01. $(1+2x^2)^6$, o coeficiente de x^8 é:

$$\binom{6}{k}^{6-k}\cdot(2x^2)^k = \binom{6}{k}2^k\cdot x^{2k}$$

$2k = 8$
$k = 4$

$$\binom{6}{4}2^4\cdot x^{2\cdot4} = \frac{6!}{4!\,2!}\cdot 16x^8 = \frac{6\cdot5\cdot\cancel{4!}}{\cancel{4!}\cdot 2}\cdot 16x^8 = \frac{30}{2}\cdot 16x^8 =$$

$$15\cdot16x^8 = 240x^8$$

Resposta: Letra C.

02.

02. $(14x-13y)^{237}$

$$(14\cdot1-13\cdot1)^{237} = (14-13)^{237} = 1^{237} = 1$$

Resposta: Letra B.

03.

03. $(x + a)^{11}$ igual a $1.386\,x^5$.

$T_{K+1} = \binom{n}{K} \cdot x^{n-K} \cdot a^K$

$T_{K+1} = \binom{11}{K} x^{11-K} \cdot a^K = 1.386\,x^5$

$11 - K = 5$

$6 = K$ ou $K = 6$

$T_7 = \binom{11}{6} x^5 \cdot a^6 = 1386\,x^5$

$T_7 = \frac{11!}{6!\,5!} \cdot a^6 = \frac{1386\,\cancel{x^5}}{\cancel{x^5}}$

$T_7 = \frac{11.10.9.8.7.\cancel{6!}}{\cancel{6!}.5.4.3.2.1} \cdot a^6 = 1386$

$T_7 = \frac{55.440}{120} \cdot a^6 = 1386$

$462 \cdot a^6 = 1386$

$a^6 = \frac{1386}{462}$

$a^6 = 3$

$a = \sqrt[6]{3}$

Resposta: Letra A.

04.

04. $\left(x + \frac{1}{x^2}\right)^9$

$$T_{K+1} = \binom{n}{K} \cdot x^{(n-K)} \cdot a^K$$

$$* \; T_{K+1} = \binom{9}{K} \cdot x^{9-K} \cdot \left(\frac{1}{x^2}\right)^K$$

$$T_{K+1} = \binom{9}{K} \cdot x^{9-K} \left(-x^{-2K}\right)$$

$$T_{K+1} = \binom{9}{K} \cdot -x\,(2K+9+K)$$

Equação

$2K+9+K=0$

$3K+9=0$

$3K=-9$

$K = \frac{-9}{-3}$

$K=3$

Resposta: $\binom{9}{3}$

Resposta: Letra D.

05.

05. $\left(x + \frac{1}{x^2}\right)^n$

$T_{K+1} = \binom{n}{K} \cdot x^{n-K} \cdot a^K$

$T_{K+1} = \binom{n}{K} \cdot x^{n-K} \cdot \left(\frac{1}{x^2}\right)^K$

$T_{K+1} = \binom{n}{K} \cdot x^{n-K} \cdot -x^{2K}$

$T_{K+1} = \binom{n}{K} \cdot -x.(n+K+2K)$

$n+K+2K=0$

$n+3K=0$

$n=-3K$

$\frac{n}{3}=K$

Resposta: Letra C.

06.

06. $\left(3x^3+\frac{2}{x^2}\right)^5 - \left(243x^{15}+810x^{10}+1080x^5+\frac{240}{x^5}+\frac{32}{x^{10}}\right)$

$1.(3x^3)^5.\left(\frac{2}{x^2}\right)^0 + 5.(3x^3)^4.\left(\frac{2}{x^2}\right)^1 + 10.(3x^3)^3.\left(\frac{2}{x^2}\right)^2 + 10.(3x^2)^2.\left(\frac{2}{x^2}\right)^3 +$

$5.(3x^3).\left(\frac{2}{x^2}\right)^4 + 1.(3x^3)^0.\left(\frac{2}{x^2}\right)^5$ *

$243x^{15} + \left(5.81x^{12}.\frac{2}{x^2}\right) + \left(10.27x^9.\frac{4}{x^4}\right) + \left(10.9x^6.\frac{8}{x^6}\right) + \left(5.3x^2.\frac{16}{x^2}\right) +$

$\frac{32}{x^{10}}$

$243x^{15} + \frac{810}{x^2} + \frac{1080x^9}{x^4} + \frac{720x^6}{\cancel{x^6}} + \frac{240x^2}{x^8} + \frac{32}{x^{10}}$

* $243x^{15} + \frac{810}{x^2} + \frac{1080x^5}{x^4} + 720 + \frac{240x^2}{x^5} + \frac{32}{x^{10}}$

termo inde pendente.

Resposta: Letra E.

07.

07. $(2x+y)^5$

$(2.1+1)^5 = (2+1)^5 = 3^5 = 3.3.3.3.3 = 243$

Resposta: Letra C.