Binômio de Newton

Prof. Dé
Matemática

Binômio de Newton

$$(2x + 1)^4 = 16x^4 + 32x^3 + 24x^2 + 8x + 1$$

Qual o terceiro termo? $= 24\,x^2$

Binômio de Newton

$(x + a)^n$ $\qquad T_{p+1} = \binom{n}{p} . x^{n-p} . a^p$

$(x + 3)^6$ $\qquad T_4 = \binom{6}{3} . x^{6-3} . 3^3$

Binômio de Newton

$(x + a)^n$ $\qquad T_{p+1} = \binom{n}{p} . x^{n-p} . a^p$

$(2x - 5)^9$ $\qquad T_7 = \binom{9}{6} . (2x)^{9-6} . (-5)^6$

Binômio de Newton

$$T_{p+1} = \binom{n}{p}.x^{n-p}.a^{p}$$

1					$(x+a)^0 = 1$
1	1				$(x+a)^1 = 1x + 1a$
1	2	1			$(x+a)^2 = 1x^2 + 2.x.a + 1a^2$
1	3	3	1		$(x+a)^3 = 1x^3 + 3.x^2a + 3.x.a^2 + 1a^3$
1	4	6	4	1	$(x+a)^4 = 1x^{4}.a^{0} + 4x^{3}.a^{1} + 6x^{2}.a^{2} + 4x^{1}.a^{3} + 1x^{0}.a^{4}$

$$(x+a)^4 = \binom{4}{0}.x^{4-0}.a^{0} + \binom{4}{1}.x^{4-1}.a^{1} + \binom{4}{2}.x^{4-2}.a^{2} + \binom{4}{3}.x^{4-3}.a^{3} + \binom{4}{4}.x^{4-4}.a^{4}$$

Binômio de Newton

$$T_{p+1} = \binom{n}{p}.x^{n-p}.a^{p}$$

Qual o termo independente no desenvolvimento de $(x^2 + \frac{1}{x^2})^8$

$T_{p+1} = \binom{n}{p}.x^{n-p}.a^{p}$

$T_{p+1} = \binom{8}{p}.(x^2)^{8-p}.(x^{-2})^{p}$

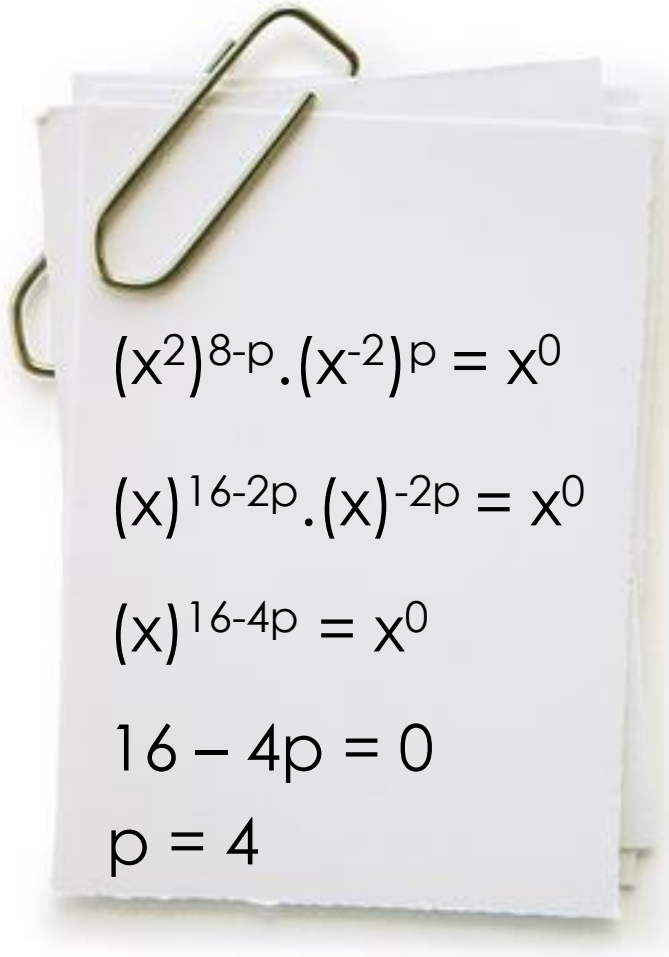
$T_{4+1} = \binom{8}{4}.(x^2)^{8-4}.(x^{-2})^{4}$

$T_5 = \binom{8}{4}.(x)^8.(x)^{-8}$

$T_5 = \frac{8!}{4!.4!}.(x)^8.(x)^{-8}$

$T_5 = 70.(x)^0$

$T_5 = 70$



Binômio de Newton

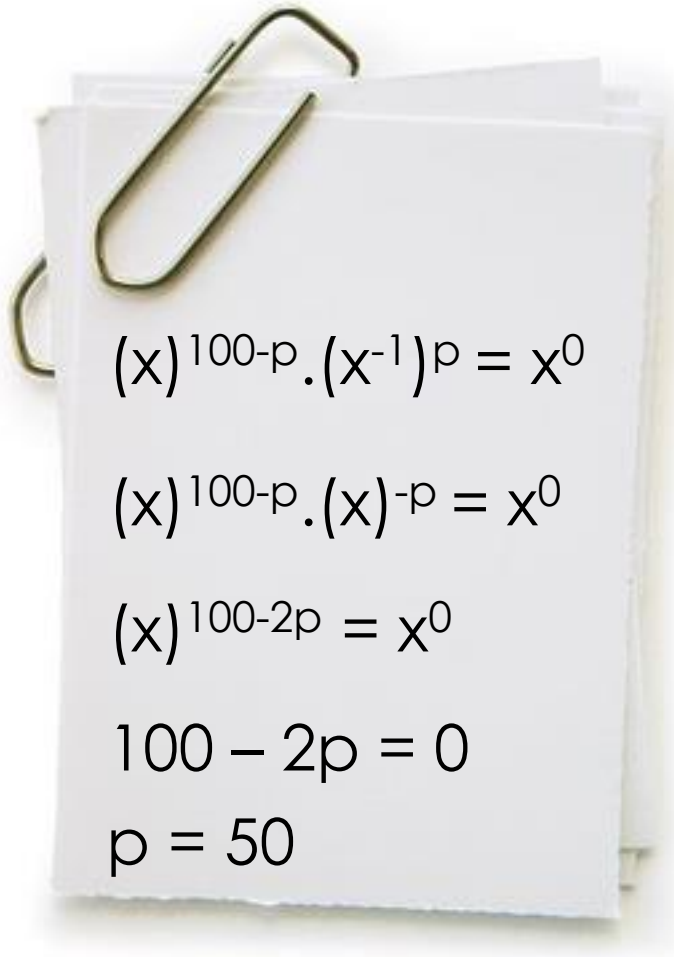
$$T_{p+1} = \binom{n}{p}.x^{n-p}.a^{p}$$

UFSC | Qual a posição do termo independente no desenvolvimento de $(x + \frac{1}{x})^{100}$

$$T_{p+1} = \binom{n}{p}.x^{n-p}.a^{p}$$

$$T_{p+1} = \binom{100}{p}.(x)^{100-p}.(x^{-1})^{p}$$

Posição = 51



Binômio de Newton

Dado o binômio $(2x + y)^5$, obtenha:

a. A soma dos coeficientes binomiais. $= 2^5$

b. A soma dos coeficientes do desenvolvimento. $= (2.\mathbf{1} + \mathbf{1})^5 = 3^5$

$$\binom{5}{0}(2x)^5 . y^0 + \binom{5}{1}(2x)^4 . y^1 + \binom{5}{2}(2x)^3 . y^2 + \binom{5}{3}(2x)^2 . y^3 + \binom{5}{4}(2x)^1 . y^4 + \binom{5}{5}(2x)^0 . y^5$$

Binômio de Newton

Obtenha o termo médio no desenvolvimento de $(x^3 - \sqrt{x})^4$.

Total de 5 termos = a b c d e

Termo médio = T_3 ➡ P = 2

$T_{p+1} = \binom{n}{p}.x^{n-p}.a^p$

$T_{2+1} = \binom{4}{2}.(x^3)^{4-2}.(x^{1/2})^2$

$T_3 = \frac{4!}{2!.2!}.x^6.x$ ➡ $T_3 = 6.x^7$

Obrigado

Prof. André
Matemática