PROFESSOR FERRETTO

1. $T_7 = ?$

$\hookrightarrow k+1 \Rightarrow k+1 = 7 \Rightarrow k = 6$

$(x-1)^{9 \to n}$, $x \to x$, $-1 \to a$

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

$$T_7 = \binom{9}{6} x^{9-6} \cdot (-1)^6$$

$$T_7 = \binom{9}{6} x^3 = \frac{9!}{6!\,3!} x^3$$

$$T_7 = \frac{9 \cdot 8 \cdot 7 \cdot 6!}{6!\,3 \cdot 2} x^3 \Rightarrow \boxed{T_7 = 84x^3}$$

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2. $T_6 = ?$

$\hookrightarrow k+1 \Rightarrow k+1 = 6 \Rightarrow k = 5$

$(x-2a)^{10 \to n}$, $x \to X$, $-2a \to a$

$$T_6 = \binom{10}{5} x^{10-5} \cdot (-2a)^5 \Rightarrow T_6 = \binom{10}{5} x^5 \cdot (-32) \cdot a^5$$

$$T_6 = \frac{10!}{5!\,5!} \cdot (-32) x^5 a^5 \Rightarrow T_6 = 252 \cdot (-32) x^5 a^5$$

$$\boxed{T_6 = -8064 x^5 a^5}$$

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3. TERMO INDEPENDENTE DE $x \Rightarrow x^0$

$$T_{k+1} = \binom{8}{k} (x^5)^{8-k} \cdot \left(\frac{2}{x}\right)^k = \binom{8}{k} x^{40-5k} \cdot \frac{2^k}{x^k}$$

$$T_{k+1} = \binom{8}{k} x^{40-5k} \cdot x^{-k} \cdot 2^k = \binom{8}{k} \underbrace{x^{40-6k}}_{x^0} \cdot 2^k$$

$$40 - 6k = 0 \Rightarrow k = \frac{20}{3} \Rightarrow \underbrace{k \notin \mathbb{N}}_{\text{NÃO PODE!}}$$

LOGO NÃO EXISTE TERMO INDEPENDENTE.

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4. $$T_{k+1} = \binom{6}{k} x^{6-k} \cdot \left(\frac{-1}{x}\right)^k = \binom{6}{k} x^{6-k} \cdot \frac{(-1)^k}{x^k}$$

$$T_{k+1} = \binom{6}{k} x^{6-k} \cdot x^{-k} \cdot (-1)^k = \binom{6}{k} \underbrace{x^{6-2k}}_{x^0} \cdot (-1)^k$$

$$6 - 2k = 0 \Rightarrow k = 3$$

$$T_{3+1} = \binom{6}{3} x^{6-2(3)} \cdot (-1)^3$$

$$T_4 = \frac{6!}{3!\,3!} x^0 \cdot (-1) \Rightarrow T_4 = 20 \cdot (-1)$$

$$\boxed{T_4 = -20}$$

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5. $$T_{k+1} = \binom{9}{k} \underbrace{x^{9-k}}_{x^6} \cdot (-1)^k$$

$$9 - k = 6 \Rightarrow k = 3$$

$$T_4 = \binom{9}{3} x^6 \cdot (-1)^3 = \frac{9!}{3!\,6!} \cdot x^6 \cdot (-1)$$

$$\boxed{T_4 = -84x^3}$$

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6. $n = 8 \Rightarrow 9$ TERMOS $\Rightarrow T_5$ $\Downarrow$ TERMO CENTRAL

$$T_5 = T_{k+1} \Rightarrow k+1 = 5 \Rightarrow k = 4$$

$$T_5 = \binom{8}{4} x^{8-4} \cdot (-2)^4 \Rightarrow T_5 = \binom{8}{4} x^4 \cdot 16$$

$$T_5 = \frac{8!}{4!\,4!} \cdot 16 \cdot x^4 \Rightarrow \boxed{T_5 = 1120x^4}$$

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7. $n = 10 \Rightarrow 11$ TERMOS $\Rightarrow T_6$ $\Downarrow$ TERMO CENTRAL

$$T_6 = T_{k+1} \Rightarrow k+1 = 6 \Rightarrow k = 5$$

$$T_6 = \binom{10}{5} x^{10-5} \cdot \left(\frac{1}{3}\right)^5 \Rightarrow T_6 = \frac{10!}{5!\,5!} x^5 \cdot \frac{1}{3^5}$$

$$T_6 = 252 \cdot x^5 \cdot \frac{1}{243} \Rightarrow \boxed{T_6 = \frac{28}{27} x^5}$$

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8. PARA CALCULAR A SOMA DOS COEFICIENTES NO DESENVOLVIMENTO DE UM BINÔMIO DE NEWTON, SEMPRE SUBSTITUA AS INCÓGNITAS POR 1.

$$(x-y)^7 \Rightarrow (1-1)^7 \Rightarrow 0^7 = 0$$

EXEMPLO:

$$(3x-a)^5 \Rightarrow (3 \cdot 1 - 1)^5 \Rightarrow (3-1)^5 \Rightarrow$$

$$2^5 = 32$$

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9. $\left(x - \frac{1}{2}\right)^{9 \to n}$, $x \to X$, $-\frac{1}{2} \to a$

$$T_6 = T_{k+1} \Rightarrow k+1 = 6 \Rightarrow k = 5$$

$$T_6 = \binom{9}{5} x^{9-5} \cdot \left(\frac{-1}{2}\right)^5 \Rightarrow T_6 = \binom{9}{5} x^4 \cdot \frac{(-1)^5}{2^5}$$

$$T_6 = \binom{9}{5} x^4 \cdot \frac{(-1)}{32} \Rightarrow T_6 = \frac{9!}{5!\,4!} \cdot x^4 \cdot \frac{(-1)}{32}$$

$$T_6 = \frac{9 \cdot 8 \cdot 7 \cdot 6 \cdot 5!}{5!\,4 \cdot 3 \cdot 2} \cdot \frac{(-1)}{32} \cdot x^4$$

$$T_6 = \frac{-126}{32} x^4 \Rightarrow \boxed{T_6 = -\frac{63}{16} x^4}$$

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10. $n = 4 \Rightarrow 5$ TERMOS $\Rightarrow T_3$ $\Downarrow$ TERMO MÉDIO

$$T_3 = T_{k+1} \Rightarrow k+1 = 3 \Rightarrow k = 2$$

$$T_3 = \binom{4}{2} x^{4-2} \cdot (-1)^2 \Rightarrow T_3 = \binom{4}{2} x^2 \cdot 1$$

$$T_3 = \frac{4!}{2!\,2!} x^2 \Rightarrow \boxed{T_3 = 6x^2}$$