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$$1. (1+2x^2)^6 \quad \binom{6}{k} 1^{6-k} (2x^2)^k = ? x^8 \rightarrow 2k=8$$

$k=4$

Termo geral

$$\binom{6}{0} 1^6 (2x^2)^0 + \binom{6}{1} 1^5 (2x^2)^1 + \dots + \binom{6}{4} 1^2 (2x^2)^4 + \dots + \binom{6}{6} 1^0 (2x^2)^6$$

$$\downarrow$$
$$\frac{6!}{4!2!} \cdot 1 \cdot 16x^8$$
$$6 \cdot 5 \cdot 4! \cdot 16x^8$$
$$4! \cdot 2$$

$$15 \cdot 16x^8$$

$$240x^8$$

coeficiente

Letra C.

$$2. (14x-13y)^{237}$$

soma dos coeficientes

$$x=1$$
$$y=1$$
$$(14 \cdot 1 - 13 \cdot 1)^{237}$$
$$(14 - 13)^{237}$$
$$1^{237} \rightarrow 1$$

Letra B

$$3. (x+a)^n \quad \binom{n}{k} x^{n-k} a^k = 7x^2 \rightarrow n-k=5$$

$$k=6$$

$$\binom{n}{6} x^8 a^6 = 1386$$

$$11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5! a^6 = 1386$$

$$6 \cdot 5!$$

$$55440 a^6 = 1386$$

$$120$$

$$462 a^6 = 1386$$

$$a^6 = 3$$

$$462$$

$$a^6 = 3$$

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

Letra A.

$$4. \left( \frac{x+1}{x^2} \right)^9 \quad \binom{9}{k} x^{9-k} \left( \frac{1}{x^2} \right)^k \rightarrow 9-k-2k=0$$

$$-3k=9$$

$$k=3 \rightarrow \binom{9}{k=3}$$

Letra D.

$$5. \left( x + \frac{1}{x^2} \right)^n = \binom{n}{k} x^{n-k} \cdot x^{-2k} \rightarrow n-k-2k=0$$

$$n-3k=0$$

$$n=3k$$

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

Letra C.

$$6. \left( 3x^3 + \frac{2}{x^2} \right)^5 = \left( 243x^{15} + 810x^{10} + 1080x^5 + 240 + \frac{32}{x^{10}} \right)$$

$$\downarrow$$

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

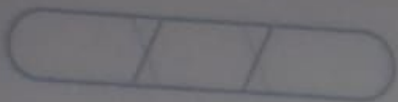
$$\downarrow$$

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

$$x = 243x^5 - 810x^5 + 1080x^5 - 240 + \frac{32}{x^{10}} - 1080x^5 + 240 - \frac{32}{x^{10}}$$

$$K=720$$

Letra E.

  
 $7. (2x + y)^5$

Soma dos coeficientes:

$x = 1$

$(2 \cdot 1 + 1)^5$

$y = 1$

$(2 + 1)^5$

$3^5 \rightarrow 243$

Letra C.