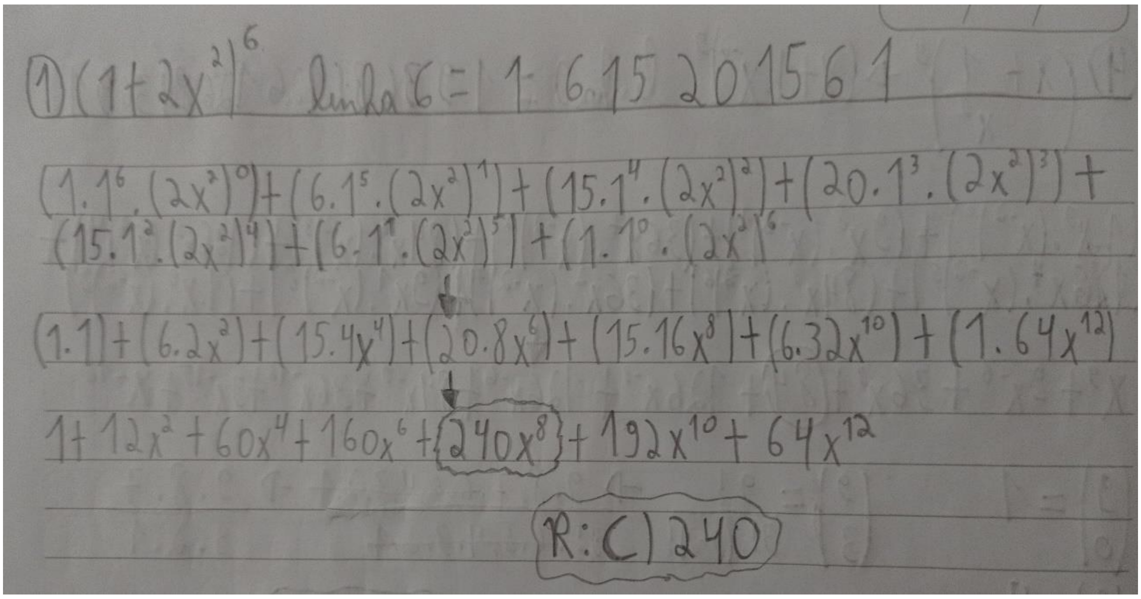
João Batista Rufino da Silva Junior. CTII 350.

Teorema do Binômio:

1.



① $(1+2x^2)^6$ linha 6 = 1 6 15 20 15 6 1

$(1.1^6.(2x^2)^0)+(6.1^5.(2x^2)^1)+(15.1^4.(2x^2)^2)+(20.1^3.(2x^2)^3)+$
$(15.1^2.(2x^2)^4)+(6.1^1.(2x^2)^5)+(1.1^0.(2x^2)^6$

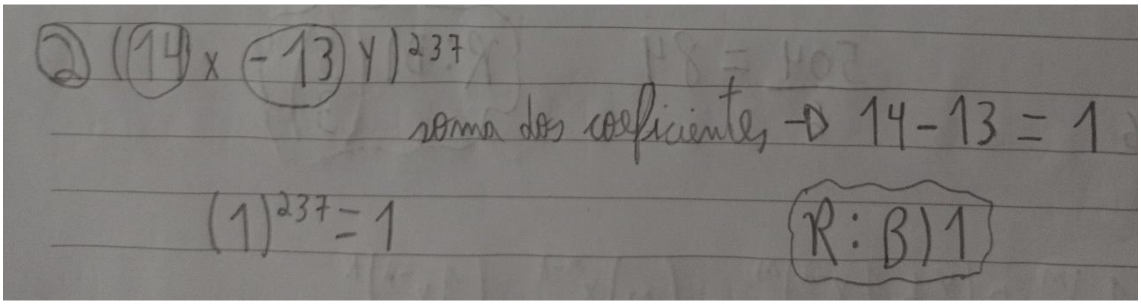
$(1.1)+(6.2x^2)+(15.4x^4)+(20.8x^6)+(15.16x^8)+(6.32x^{10})+(1.64x^{12})$

$1+12x^2+60x^4+160x^6+\boxed{240x^8}+192x^{10}+64x^{12}$

$\boxed{\text{R: C) 240}}$

R: c) 240

2.



② $(14x-13y)^{237}$

soma dos coeficientes → $14-13=1$

$(1)^{237}=1$

$\boxed{\text{R: B) 1}}$

R: b) 1

3.

$③\ (x+a)^{11} = 1386x^5 \qquad \binom{11}{6} x^5 . a^6 = 1386 \rightarrow \frac{11!}{6!.(11-6)!} \rightarrow \frac{11.10.9.8.7.\cancel{6.5..}}{5!.\cancel{6.5.4.3.2.1}}$

$\frac{11.10.9.8.7}{5.4.3.2.1} \rightarrow \frac{55440}{120} = 462$

$462x^5 . a^6 = 1386x^5$

$a^6 = \frac{1386\cancel{x^5}}{462\cancel{x^5}}$

$a^6 = 3$

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

$R: A)\ \sqrt[6]{3}$

R: a) $\sqrt[6]{3}$

4.

$④\ \left(x + \frac{1}{x^2}\right)^9 \rightarrow (x+1.x^{-2})^9$ linha 9 = 1 9 36 84 126 126 84 36 9 1

$(1.x^9.(x^{-2})^0) + (9x^8.(x^{-2})^1) + (36x^7.(x^{-2})^2) + (84x^6.(x^{-2})^3) + (126x^5.(x^{-2})^4) +$
$(126x^4.(x^{-2})^5) + (84x^3.(x^{-2})^6) + (36x^2.(x^{-2})^7) + (9x^1.(x^{-2})^8) + (1.x^0.(x^{-2})^9)$

$\downarrow$

$x^9 + 9x^{-6} + 36x^3 + 84 + 126x^{-3} + 126x^{-6} + 84x^{-9} + 36x^{-12} + 9x^{-15} + x^{-18}$

$\binom{9}{0} = 1 \qquad \binom{9}{3} = \frac{9!}{3!.(9-3)!} \rightarrow \frac{9.8.7.\cancel{6.5.4.3.2.1}}{3!.\cancel{6.5.4.3.2.1}} \rightarrow \frac{9.8.7}{3.2.1}$

$\binom{9}{1} = 9 \qquad \frac{504}{6} = 84 \qquad R: D)\ \binom{9}{3}$

$\binom{9}{2} = 36$

R: d) $\binom{9}{3}$

5.

$$\textcircled{5}\ \left(x+\frac{1}{x^2}\right)^n \to \left(x+1\cdot x^{-2}\right)^n \qquad \binom{n}{k} x^{n-k} \left(1x^{-2}\right)^k$$

$$\binom{n}{k} x^{n-k}\, x^{-2k}$$

$$n-k-2\cdot k=0$$
$$n=3k$$
$$k=\frac{n}{3}$$

R: c) se n é divisível por 3

R: c) se n é divisível por 3.

6.

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

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

linha 5 = 1 5 10 10 5 1

$$\left(1.(3x^3)^5.(2x^{-2})^0\right)+\left(5.(3x^3)^4.(2x^{-2})^1\right)+\left(10.(3x^3)^3.(2x^{-2})^2\right)+$$
$$\left(10.(3x^3)^2.(2x^{-2})^3\right)+\left(5.(3x^3)^1.(2x^{-2})^4\right)+\left(1.(3x^3)^0.(2x^{-2})^5\right)$$
$$\downarrow$$
$$\left(\cancel{243x^{15}}+\cancel{810x^{10}}+\cancel{1080x^5}+720+\cancel{240x^{-5}}+\cancel{32x^{-10}}\right)$$
$$-$$
$$\left(\cancel{243x^{15}}+\cancel{810x^{10}}+\cancel{1080x^5}+\cancel{240x^{-5}}+\cancel{32x^{-10}}\right)$$
$$=$$
$$720$$

R: E) 720

R: e) 720

7.

7 $(2x+y)^5 \rightarrow (2x+1y)^5 \rightarrow (2+1)^5 \rightarrow 3^5 = 243$

(R: c) 243)

R: c) 243