1. $\sum_{n=0}^{\infty}(x-3)^n$

Usando crit de raiz

$$\lim_{n\to+\infty} \sqrt[\cancel{n}]{|x-3|^{\cancel{n}}}$$

$$|x-3| \lim_{n\to+\infty} 1 \to K$$

Intervalo | Radio

$1.\ |x-3| < 1$ | $\frac{4-2}{2}$

$-1 < x-3 < 1$

$2 < x < 4$ | $=1$

$$\boxed{I =]2,4[\quad R = 1}$$

2. $\sum_{m=0}^{\infty}(4x+6)^m$

Usando crit de raiz

$$\lim_{n\to+\infty} \sqrt[\cancel{n}]{|4x+6|^{\cancel{n}}}$$

$$|4x+6| \lim_{n\to+\infty} 1 \to K$$

Intervalo | Radio

$1.\ |4x+6| < 1$ | $\frac{\frac{-5}{4} - \frac{-7}{4}}{2}$

$-1 < 4x+6 < 1$

$-7 < 4x < -5$ | $= \frac{1}{4}$

$\frac{-7}{4} < x < \frac{-5}{4}$

$$\boxed{I =]\tfrac{-7}{4}, \tfrac{-5}{4}[\quad R = \tfrac{1}{4}}$$

$\sum^{\infty}$

$$3.\ \sum_{n=0} n^n \cdot (1-x)^n$$

Por crit de raiz

$$\lim_{n\to+\infty} \sqrt[\cancel{n}]{n^{\cancel{n}} \cdot |1-x|^{\cancel{n}}}$$

$$|1-x| \lim_{n\to+\infty} n = +\infty$$

$+\infty\, |1-x| < 1$

Intervalo $\qquad$ Radio

$1-x=0 \qquad R=0$

$x=1$

$$\boxed{I=\{1\} \qquad R=0}$$

$$4.\ \sum_{k=0}^{\infty}[-7(3-2x)]^k$$

Por crit de raiz

$$\lim_{n\to+\infty} \sqrt[\cancel{n}]{|-21+14x|^{\cancel{n}}}$$

$$|-21+14x| \lim_{n\to+\infty} 1$$

Intervalo $\qquad$ Radio

$1 \cdot |-21+14x| < 1$ $\qquad \dfrac{\frac{11}{7}-\frac{10}{7}}{2}$

$-1 < -21+14x < 1$

$20 < 14x < 22$ $\qquad = \dfrac{1}{14}$

$\dfrac{10}{7} < x < \dfrac{11}{7}$

$$\boxed{I = \left]\frac{10}{7}, \frac{11}{7}\right[\qquad R=\frac{1}{14}}$$

$$5.\ \sum_{n=1}^{\infty}[1-(-2)^n]\cdot x^n$$

Por crit de raiz

$$\lim_{n\to+\infty}\sqrt[n]{[1-|2|^n]\cdot|x|^n}$$

$$\lim_{n\to+\infty}\sqrt[\cancel{n}]{2^{\cancel{n}}\cdot|x|^{\cancel{n}}}$$, Por dominancia

$$|x|\lim_{n\to+\infty} 2$$

$$2\cdot|x|<1 \qquad \frac{\frac{1}{2}-\left(-\frac{1}{2}\right)}{2}$$

$$|x|<\frac{1}{2} \qquad \frac{1}{2}$$

$$-\frac{1}{2}<x<\frac{1}{2}$$

$$\boxed{I=\left]-\frac{1}{2},\frac{1}{2}\right[\qquad R=\frac{1}{2}}$$

$$6.\ \sum_{k=0}^{\infty}\frac{k}{k+1}\cdot(x-2)^k$$

Por crit de raiz

$$\lim_{n\to+\infty}\sqrt[n]{\frac{n}{n+1}\cdot(x-2)^n}$$

$$\lim_{n\to+\infty}\frac{\overbrace{\cancel{\sqrt[n]{n}}}^{=1}}{\underbrace{\cancel{\sqrt[n]{n+1}}}_{=1}}\cdot\sqrt[\cancel{n}]{|x-2|^{\cancel{n}}}$$

$$|x-2|\lim_{n\to+\infty} 1$$

$$1\cdot|x-2|<1 \qquad \frac{3-1}{2}$$

$$-1<x-2<1$$

$$1<x<3$$

$$\boxed{I=]1,3[\qquad R=1}$$

$$\sum^{\infty}\frac{(2y+4)^k}{\ }$$

7. $\sum_{k=0} \frac{(\ldots)}{k!}$

Por crit de razon

$$\lim_{n\to+\infty} \frac{\frac{(2x+4)^{n+1}}{(n+1)!}}{\frac{(2x+4)^n}{n!}}$$

$$\lim_{n\to+\infty} \frac{\cancel{(2x+4)^n}\cdot(2x+4)\cdot\cancel{n!}}{\cancel{(2x+4)^n}\cdot(n+1)\cdot\cancel{n!}}$$

$$|2x+4| \lim_{n\to+\infty} \cancel{\frac{1}{n+1}} = 0$$

$0\cdot|2x+4|<1$

$\boxed{I=\mathbb{R} \qquad \text{Radio} = +\infty}$

8. $\displaystyle\sum_{n=0}^{\infty} \frac{(t+1)^n}{n+1}$

Por crit de raiz

$$\lim_{n\to+\infty} \sqrt[n]{\frac{|x+1|^n}{(n+1)}}$$

$$\lim_{n\to+\infty} \frac{\sqrt[\cancel{n}]{(x+1)^{\cancel{n}}}}{\cancel{\sqrt[n]{n+1}}=1}$$

$$|x+1| \lim_{n\to+\infty} \frac{1}{1} = 1$$

$1\cdot|x+1|<1$ $\qquad \frac{0--2}{2}$

$-1<x+1<1$ $\qquad =1$

$-2<x<0$

$\boxed{I =]-2,0[\qquad R=1}$

10. $\displaystyle\sum_{n=0}^{\infty} (2-x)^{3n} \cdot \frac{n!}{2^n}$

Por crit de razon

$$\lim_{n\to+\infty} \frac{\frac{(2-x)^{3n+3}\cdot(n+1)!}{2^{n+1}}}{\frac{(2-x)^{3n}\cdot n!}{2^{n}}}$$

$$\lim_{n\to+\infty} \frac{\cancel{(2-x)^{3n}}\cdot(2-x)^{3}\cdot(n+1)\cdot\cancel{n!}\cdot\cancel{2^{n}}}{\cancel{(2-x)^{3n}}\cdot\cancel{n!}\cdot\cancel{2^{n}}\cdot 2}$$

$$|2-x|^{3}\lim_{n\to+\infty}\frac{n+1}{2} = +\infty$$

$$+\infty|2-x|^{3} < 1$$

$$\boxed{I = 2 \qquad R = 0}$$

11. $$\sum_{n=1}^{\infty}\frac{3^{n}\cdot(x-1)^{n}}{n}$$

Por crit de raiz

$$\lim_{n\to+\infty}\sqrt[n]{\frac{3^{n}\cdot(x-1)^{n}}{n}}$$

$$|x-1|\lim_{n\to+\infty}\frac{3}{\sqrt[n]{n}=1} = 3$$

$$3|x-1| < 1$$

$$|x-1| < \frac{1}{3}$$

$$-\frac{1}{3} < x-1 < \frac{1}{3} \qquad \frac{\frac{1}{3}-\left(-\frac{1}{3}\right)}{2}$$

$$\frac{2}{3} < x < \frac{4}{3}$$

$$\boxed{I = \left]\frac{2}{3}, \frac{4}{3}\right[\qquad R = \frac{1}{3}}$$