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What you'll Learn About
Interval and Radius of Convergece

Find the Radius of Convergence

8) $\sum_{n=0}^{\infty}(x+5)^n =$ $r = x+5$

$$-1 < x+5 < 1$$
$$-5 \quad -5 \quad -5$$
$$-6 < x < -4$$

R.O.C = 1

8) $\sum_{n=0}^{\infty}(x+5)^n =$

$$\lim_{n\to\infty}\left|\frac{(x+5)^{n+1}}{(x+5)^n}\right| = |x+5| < 1$$

$$\frac{(x+5)^n \cdot (x+5)^1}{(x+5)^n}$$

$$-1 < x+5 < 1$$
$$-5 \quad -5 \quad -5$$
$$-6 < x < -4$$

R.O.C = 1

	12) $\sum_{n=0}^{\infty} \frac{nx^n}{n+2} =$ $\lim_{n\to\infty} \left| \frac{(n+1)\cancel{x^{n+1}}}{(n+3)} \cdot \frac{(n+2)}{n\,\cancel{x^n}} \right| = \left| \frac{x(n+1)(n+2)}{n(n+3)} \right| = \lvert x \rvert < 1$ I.O.C $-1 < x < 1$ R.O.C $= 1$ 18) $\sum_{n=0}^{\infty} \frac{\sqrt{n}x^n}{3^n} =$ $\lim_{n\to\infty} \left| \frac{\sqrt{n+1}\; x^{n+1}}{3^{n+1}} \cdot \frac{3^n}{\sqrt{n}\, x^n} \right| = \left| \frac{x\sqrt{n+1}}{3\sqrt{n}} \right| = \left| \frac{x}{3} \right| < 1$ $-1 < \frac{x}{3} < 1$ I.O.C $-3 < x <$ R.O.C. $= 3$

$$A)\quad \sum_{n=0}^{\infty}\frac{(-1)^n x^n}{(2n)!} =$$

$$\lim_{n\to\infty}\left|\frac{(-1)^{n+1}x^{n+1}}{(2n+2)!}\cdot\frac{(2n)!}{(-1)^n x^n}\right| = \left|\frac{x}{(2n+2)(2n+1)}\right| = 0 < 1$$

Absolutely Converges Always

I.O.C $-\infty < x < \infty$

R.O.C $= \infty$

$$15)\quad \sum_{n=1}^{\infty}(n+1)!\,x^n =$$

$$\lim_{n\to\infty}\left|\frac{(n+2)!\cdot x^{n+1}}{(n+1)!\cdot x^n}\right| = \left|x(n+2)\right| = \infty > 1$$

$$\frac{(n+2)!}{(n+1)!} = n+2$$

diverges, except at $x = 0$

(center)

$$\sum 0 = 0+0+0+0$$