

Name KEY Section _____

Find the radius of convergence and interval of convergence for the following power series.

$$\sum_{n=1}^{\infty} \frac{(x+2)^n}{n^2} \quad \text{center } a = -2$$

① RATFACE (ratio test)
$$r = \lim_{n \rightarrow \infty} \left| \frac{(x+2)^{n+1}}{(n+1)^2} \cdot \frac{n^2}{(x+2)^n} \right|$$

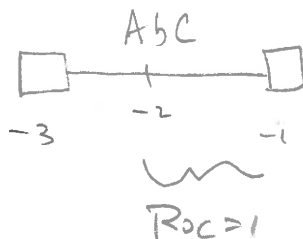
$$= |x+2| \lim_{n \rightarrow \infty} \frac{n^2}{(n+1)^2} = |x+2| \lim_{n \rightarrow \infty} \left(\frac{n}{n+1} \right)^2 = |x+2| \lim_{n \rightarrow \infty} \left(\frac{1}{1 + \frac{1}{n}} \right)^2$$

$$= |x+2|$$

② Solve $|x+2| < 1$

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

$$-3 < x < -1$$



③ endpoints

$x = -3$ $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$ This series is ABC since $\sum \frac{1}{n^2}$ is a convergent p - \sum ($p=2 > 1$) so it C's. } or do AS Test

$x = -1$ $\sum_{n=1}^{\infty} \frac{1^n}{n^2} = \sum_{n=1}^{\infty} \frac{1}{n^2}$ convergent p - \sum ($p=2 > 1$)

$$R_{OC} = 1 \quad I_{OC} = [-3, -1]$$