

Score:

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SM286 – Quiz 16 Power Series

1. Find the radius and interval of convergence for :

$$\sum_{n=0}^{\infty} 2^{n+1}(x+4)^n$$

- Ratio Test: $\lim_{n \rightarrow \infty} \left| \frac{2^{n+2}(x+4)^{n+1}}{2^{n+1}(x+4)^n} \right| = \lim_{n \rightarrow \infty} |2(x+4)| = 2|x+4| < 1$
- $\rightarrow |x+4| < \frac{1}{2} \rightarrow -\frac{1}{2} < x+4 < \frac{1}{2} \rightarrow -\frac{9}{2} < x < -\frac{7}{2}$
- Radius of Convergence: $R = \frac{1}{2}$
- Interval of Convergence: $-\frac{9}{2} < x < -\frac{7}{2}$

2. Rewrite the following power series in terms of x^k :

$$\sum_{n=3}^{\infty} (n+3)2^{n+1}x^{n-1}$$

- Add 1 to each n:

$$\sum_{n+1=3}^{\infty} (n+1+3)2^{n+1+1}x^{n+1-1} = \sum_{n=2}^{\infty} (n+4)2^{n+2}x^n$$

- Replace n with k:

$$\sum_{k=2}^{\infty} (k+4)2^{k+2}x^k$$