Allison
Ben
Kristin
Andrew

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3. $\sum_{n=1}^{\infty} \frac{x^n}{\sqrt{n}}$

$$\lim_{n\to\infty} \left| \frac{x^{n+1}}{\sqrt{n+1}} \cdot \frac{\sqrt{n}}{x^n} \right| = \lim_{n\to\infty} \left| \frac{x\sqrt{n}}{\sqrt{n+1}} \right| = |x| \lim_{n\to\infty} \frac{\sqrt{n}}{\sqrt{n+1}}$$

$|x| \cdot 1$

$\sum_{n=1}^{\infty} \frac{-1^n}{\sqrt{n}}$ divergent

$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ divergent

convergent when $-1 \leq x < 1$

divergent $x$ $(-\infty, -1)$ and $(1, \infty)$

Will R, Adam B, Thomas S

Power Series

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3. $\sum_{n=1}^{\infty} \frac{x^n}{\sqrt{n}}$

Ratio Test

$\lim_{n\to\infty} \left| \frac{\frac{x^{n+1}}{\sqrt{n+1}}}{\frac{x^n}{\sqrt{n}}} \right| \cdot \frac{\sqrt{n}}{x^n} = \lim_{n\to\infty} \left| x \sqrt{\frac{n}{n+1}} \right| = |x| \lim_{n\to\infty} \sqrt{\frac{n}{n+1}} = |x| \cdot 1 = \boxed{|x|}$

Converges when $-1 < x < 1$

$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{1/2}}$, convergent alt. series

$\sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$, divergent p-series

Radius of convergence = 1

Interval of convergence = $[-1, 1)$

Tanner Bert
Justin Asabey
Andy Chleborad

3) $\sum_{n=0}^{\infty} \frac{x^n}{\sqrt{n}}$

$\lim_{n\to\infty} \left| \frac{\frac{x^{n+1}}{\sqrt{n+1}}}{\frac{x^n}{\sqrt{n}}} \right| \to \lim_{n\to\infty} \frac{x^{n+1} \cdot \sqrt{n}}{x^n \cdot \sqrt{n+1}}$

$\lim_{n\to\infty} |x| \frac{\sqrt{n}}{\sqrt{n+1}}$ $\quad |x| \cdot 1 < 1$ $\quad$ radius $= 1$

$[-1, 1)$

$\lim_{n\to\infty} \frac{(-1)^n}{\sqrt{n}}$ converges

$\lim_{n\to\infty} \frac{1^n}{\sqrt{n}}$ diverges

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