

Evaluate integral or show that it diverges.

$$\textcircled{1} \int_{-2}^0 \frac{1}{\sqrt{4-x^2}} dx$$

$$\textcircled{2} \int_{-1}^1 x^{-4/3} dx$$

$$\textcircled{3} \int_0^{\pi/2} \tan^2 x dx$$

$$\textcircled{4} \int_0^9 \frac{x}{\sqrt[3]{x-1}} dx$$

$$\textcircled{5} \int_{-1}^2 \frac{1}{x^2} \cos\left(\frac{1}{x}\right) dx$$

Given a_n , find first 3 terms of sequence $\{a_n\}$
+ find $\lim_{n \rightarrow \infty} a_n$, if it exists, or state that the
sequence diverges.

$$\textcircled{1} \quad a_n = (-1)^{n+1} \left(\frac{1}{n}\right)$$

$$\textcircled{2} \quad a_n = \frac{5n}{e^{2n}}$$

$$\textcircled{3} \quad a_n = \frac{\cos^2 n}{3^n}$$

$$\textcircled{4} \quad a_n = e^{-n} \ln n$$

$$\textcircled{5} \quad a_n = \frac{n^2}{2n-1} - \frac{n^2}{2n+1}$$

Find a series representation of these functions.

$$\textcircled{1} f(x) = \frac{x^2 + 1}{x - 1}$$

$$\textcircled{2} f(x) = \frac{x}{2 - 3x}$$

$$\textcircled{3} f(x) = \frac{x^3}{4 - x^3}$$

$$\textcircled{4} f(x) = x e^{x^2}$$

$$\textcircled{5} f(x) = \cosh x$$

Find the radius of convergence for these power series.

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

$$\textcircled{2} \sum_{n=1}^{\infty} \frac{1}{n(2^n)} (x+10)^n$$

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

$$\textcircled{4} \sum_{n=0}^{\infty} \frac{(2n)!}{(n!)^2} x^n$$

$$\textcircled{5} \sum_{n=0}^{\infty} \frac{(x+5)^n}{(n+5)!}$$

Determine if each series is absolutely convergent, conditionally convergent or divergent.

$$\textcircled{1} \sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2+1}$$

$$\textcircled{2} \sum_{n=1}^{\infty} (-1)^n e^{-n}$$

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

$$\textcircled{4} \sum_{n=1}^{\infty} \frac{2^{n-1}}{5^n(n+1)}$$

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

$$\textcircled{6} \sum_{n=2}^{\infty} (-1)^n \frac{3}{n^4-1}$$

$$\textcircled{7} \sum_{n=1}^{\infty} \frac{10-2^n}{n!}$$

$$\textcircled{8} 1 + \frac{3}{2!} + \frac{3(5)}{3!} + \frac{3(5)(7)}{4!} + \dots$$

$$\textcircled{9} \sum_{n=1}^{\infty} \frac{\sin \sqrt{n}}{\sqrt{n^3+1}}$$

$$\textcircled{10} \sum_{n=1}^{\infty} (-1)^n \frac{2n+1}{n^2+n^3}$$

$$\textcircled{11} \sum_{n=1}^{\infty} \frac{2}{n^3+e^n}$$

$$\textcircled{12} \sum_{n=1}^{\infty} \frac{1}{n(\ln n)^5}$$

$$\textcircled{13} \sum_{n=1}^{\infty} (-1)^n 3^{1/n}$$

$$\textcircled{14} \sum_{n=1}^{\infty} \frac{(2n)^n}{(5n+3n^{-1})^n}$$

$$(15) \sum_{n=1}^{\infty} \frac{\cos(n\pi/6)}{n^2}$$

$$(16) \sum_{n=1}^{\infty} (n^2 + 9)(-2)^{1-n}$$

$$(17) \sum_{n=1}^{\infty} \frac{n + \cos n}{n^3 + 1}$$

$$(18) \sum_{n=1}^{\infty} \frac{e^n}{n e^n}$$

$$(19) \sum_{n=0}^{\infty} \frac{1}{2 + (1/2)^n}$$

$$(20) \sum_{n=1}^{\infty} \frac{1 - \cos n}{n^2}$$

$$(21) \sum_{n=5}^{\infty} \frac{1}{n^2 - 4n}$$

$$(22) \sum_{n=1}^{\infty} n^{-2} e^{1/n}$$