Do these converge or diverge? Justify

$$\sum_{k=0}^{\infty}\left(\frac{-1}{3}\right)^k$$

$$\sum_{k=1}^{\infty}\left(\frac{\cos(k\pi)}{\sqrt{k}}\right)$$

Do these converge or diverge? Justify

$$\sum_{k=0}^{\infty}\left(\frac{k^2}{k^3+2}\cdot(-1)^k\right)$$

$$\sum_{k=0}^{\infty}\frac{k}{2^k}\cos(k\pi)$$

$$\sum_{k=1}^{\infty}\left(k\cdot\sin\left(\frac{1}{k}\right)\cdot(-1)^k\right)$$

$$\sum_{k=0}^{\infty}x^k$$

$$\sum_{k=1}^{\infty}\frac{(x-2)^k}{k}$$

$$\sum_{k=1}^{\infty}\frac{(x-3)^k}{k^2}$$

$$\sum_{n=1}^{\infty}\frac{(x+1)^n}{\sqrt{n}}$$

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

$$\sum_{k=1}^{\infty} \frac{(x+1)^k}{3^k \cdot k}$$

Find the radius of convergence

$$\sum_{k=1}^{\infty} \frac{x^{2k}(k)!}{k^k}$$

Simplify

$$1-x^2+x^4-x^6+x^8+\ldots$$

Estimate the following integral using series

$$\int_0^1 e^{\left(-\frac{x^2}{2}\right)} dx =$$

$$\int_0^1 \frac{1}{1+\sqrt{x}} dx$$

$$\int \frac{\sin(x)}{x}\,dx =$$

Write the first three terms of the Taylor polynomial for tan(x) evaluated around 45º. (Careful)

Write a Taylor series to approximate $Tan^{-1}(x^2)$

Use an infinite series to approximate $\sqrt{5}$

Use a McLaurin series to approximate ln(16)