

Which Convergence Test?

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

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

(3)  $\sum_{k=1}^{\infty} \frac{1}{2k+9}$

(4)  $\sum_{k=1}^{\infty} k^{-4}$

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

(6)  $\sum_{k=1}^{\infty} \frac{k+1}{k(k+2)}$

(7)  $\sum_{k=1}^{\infty} \left(\frac{-2}{7}\right)^{k+1}$

(8)  $\sum_{k=1}^{\infty} \frac{5}{(k+2)(k+3)}$

(9)  $\sum_{k=1}^{\infty} \frac{k^3}{(k+1)(k+2)}$

(10)  $\sum_{k=1}^{\infty} \frac{k!}{10^{2k}}$

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

(12)  $\sum_{k=1}^{\infty} \left(\frac{\ln k}{k}\right)^k$

Show whether the following series converge or diverge. Use a convergence test to prove your conclusion

$$(1) \sum_{k=1}^{\infty} \frac{\sqrt{k}}{k^2+1}$$

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

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

$$(4) \sum_{k=1}^{\infty} \frac{k^2}{e^k}$$

$$(5) \sum_{k=1}^{\infty} \left( \frac{k}{2k+100} \right)^k$$

$$(6) \sum_{k=1}^{\infty} \frac{1}{2k+9}$$

$$(7) \sum_{k=1}^{\infty} \frac{10^k}{k!}$$

$$(8) \sum_{k=1}^{\infty} \left( \frac{-2}{3} \right)^{k+1}$$