Not turned in!

Worksheet: Does the series converge or diverge?

For each of the following 13 infinite series, **determine whether it converges or diverges**. Justify your statement using the following tests or known series:

- geometric series
- telescoping series
- p-series
- divergence test
- integral test
- comparison test
- limit comparison test

In many cases, there is more than one correct answer.

A. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n2^n}$

B. $\displaystyle\sum_{n=1}^{\infty} 2^n$

C. $\displaystyle\sum_{n=1}^{\infty} \frac{n}{2^n}$

D. $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^3}$

E. $\displaystyle\sum_{n=1}^{\infty} \frac{n-4}{n^3+2n}$

F. $\displaystyle\sum_{n=2}^{\infty} \frac{1+\cos(n)}{e^n}$

G. $\displaystyle\sum_{n=3}^{\infty} \frac{n^2}{\sqrt{n^3-1}}$

H. $\displaystyle\sum_{n=1}^{\infty} \frac{n^3}{(n^4-3)^2}$

I. $\displaystyle\sum_{n=1}^{\infty} (-1)^n 3^{-n/3}$

J. $\displaystyle\sum_{n=2}^{\infty} \frac{|\sin(n)|}{n}$

K. $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n!}$

L. $\displaystyle\sum_{n=1}^{\infty} \frac{n}{n^2+1}$

M. $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n^2-1}$

Observation and Question. In every case above you could use a computer to find S_{1000}, the partial sum of the first thousand terms. In which cases could you find the exact sum of the infinite series?