Determine if the following sequences converge or diverge. If it converges, find its limit.

$a_n = \dfrac{n^2-3}{2+2n^2}$	$a_n = \dfrac{\sin(n)}{\ln(n+1)}$	$a_n = \dfrac{2^n}{3^{n-2}}$
$a_n = \sin[\left(\frac{n}{2}\right)\pi]$		$a_n = n^{1/n}$

Find the sum of the following geometric series

$\sum_{k=0}^{\infty} (\frac{1}{2})^k$	$1 - (4/9) + (16/81) - (64/729) + \cdots$	$\pi + e + (e^2/\pi) + (e^3/\pi^2) + \cdots$

Determine if the following converge or diverge

$\sum_{n=1}^{\infty} \dfrac{1}{n+3^n}$	$\sum_{n=1}^{\infty} \dfrac{(-2)^{2n}}{n^n}$	$\sum_{n=1}^{\infty} \dfrac{\sqrt{n^2-1}}{n^3+2n^2+5}$
$\sum_{n=1}^{\infty} (-1)^n \dfrac{n}{n+2}$	$\sum_{n=1}^{\infty} \tan(1/n)$	$\sum_{n=1}^{\infty} \dfrac{n^2 2^{n-1}}{(-5)^n}$
$\sum_{k=3}^{\infty} [(\ln k)/k]^k$	$\sum_{n=1}^{\infty} \dfrac{n^2+1}{5^n}$	$\sum_{n=2}^{\infty} \dfrac{1}{n\sqrt{\ln n}}$
$\sum_{n=1}^{\infty} \dfrac{(2^k)^k}{(k^2)^k}$	$\sum_{n=2}^{\infty} \dfrac{(-1)^{n+1}}{n \ln n}$	$\sum_{k=1}^{\infty} k^2 e^{-k}$
$\sum_{n=1}^{\infty} \dfrac{3^n n^2}{n!}$	$\sum_{k=1}^{\infty} \dfrac{5^k}{3^k+4^k}$	$\sum_{n=1}^{\infty} (-1)^n 2^{1/n}$
$\sum 3(3/4)^n$	$\sum 2\sqrt[3]{n^{-5}}$	$\sum \dfrac{n}{\ln(n+1)}$
$\sum \dfrac{(n+2)!}{2^n(n!)}$	$\sum \dfrac{n}{2n+1}$	$\sum_{n=1}^{\infty} \dfrac{1}{n(n+1)}$
$\sum_{n=1}^{\infty} \dfrac{n+1}{n!}$	$\sum_{n=1}^{\infty} \dfrac{lnn}{2^n}$	$\sum_{n=1}^{\infty} \dfrac{e^{\pi/2}}{\pi^n}$

Determine if the following diverges, converges absolutely, or converges conditionally

$\sum_{k=1}^{\infty} (-1)^k/\sqrt{k}$	$\sum_{k=3}^{\infty} (\ln k)/(-3)^k$	$\sum_{k=1}^{\infty} (-2)^k/k^2$
$\sum_{k=0}^{\infty} (-1)^k k^3/e^{k^4}$	$\sum_{k=1}^{\infty} (-2)^k/k!$	$\sum_{k=3}^{\infty} (-1)^k/(k \ln^2 k)$