	Determine if the series converges or diverges using either the nth term test or recognizing if the series is geometric.
	A) $\sum_{n=1}^{\infty} \frac{5n+2}{3n-1}$ Diverges $\lim_{n\to\infty} \frac{5n+2}{3n-1} = \frac{5}{3} \neq 0$
	B) $\sum_{n=1}^{\infty} \left(\frac{2}{5^n}\right) = \sum_{n=1}^{\infty} 2\left(\frac{1}{5}\right)^n$ converges $r = \frac{1}{5}$ $\lvert r \rvert < 1$ $\lim_{n\to\infty} \frac{2}{5^n} = 0$
$7! = 7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1$	C) $\sum_{n=1}^{\infty} \left(\frac{4^n}{50}\right)$ Geometric $r = 4$ $\lvert r \rvert > 1$ diverges OR $\lim_{n\to\infty} \frac{4^n}{50} = \infty \neq 0$ Diverges
$n! = n(n-1)(n-2)(n-3)\cdots$	D) $\sum_{n=1}^{\infty} \left(\frac{2n!}{5n!+3}\right)$ Diverge $\lim_{n\to\infty} \frac{2n!}{5n!+3} = \frac{2}{5} \neq 0$

What you'll Learn About
The Integral Test/P-Series Test/Comparison Test

Integral Test

$\lim_{n\to\infty} \frac{1}{n^2} = 0$

A) $\sum_{n=1}^{\infty} \frac{1}{n^2}$ Converges b/c $\int_1^{\infty} \frac{1}{x^2}$ converges

$\lim_{b\to\infty} \int_1^b \frac{1}{x^2} = \int_1^b x^{-2}\,dx = -x^{-1}\Big]_1^b = -\frac{1}{x}\Big]_1^b$

$\lim_{b\to\infty} \left[-\frac{1}{b} - (-1)\right] = 1$

Area Converges to 1

$\lim_{n\to\infty} \frac{1}{n} = 0$

B) $\sum_{n=1}^{\infty} \frac{1}{n}$ diverges b/c $\int_1^{\infty} \frac{1}{x}$ diverges

$\lim_{b\to\infty} \int_1^b \frac{1}{x}\,dx = \ln x\Big]_1^b = \ln b - \ln 1 = \infty$

Area Diverges

C) $\sum_{n=1}^{\infty} \frac{1}{n^{1/3}}$ diverges because $\int_1^{\infty} x^{-1/3}$ diverges

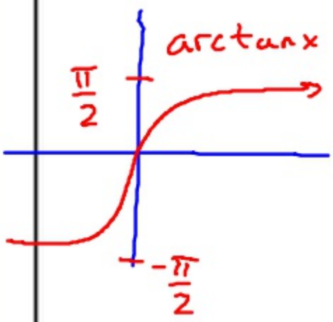
$\lim_{b\to\infty} \int_1^b x^{-1/3}\,dx = \frac{3}{2} x^{2/3}\Big]_1^b = \frac{3}{2} b^{2/3} - \frac{3}{2} = \infty$

diverges

$D)\quad \sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$

$p = \frac{3}{2} > 1$ converges

$E)\quad \sum_{n=1}^{\infty} \frac{1}{n^2+9}$ → Converges b/c $\int_1^{\infty} \frac{1}{x^2+9}$ converges



$$\lim_{b\to\infty} \int_1^b \frac{1}{x^2+9}\,dx = \frac{1}{3}\arctan\frac{x}{3}\Big]_1^b = \frac{1}{3}\arctan\frac{b}{3} - \frac{1}{3}\arctan\frac{1}{3}$$

$$= \frac{1}{3}\left(\frac{\pi}{2}\right) - \frac{1}{3}\arctan\frac{1}{3}$$

converges

P-Series Test

$A)\quad \sum_{n=1}^{\infty} \frac{1}{n^2}$ $\quad p = 2 > 1$ converges

$B)\quad \sum_{n=1}^{\infty} \frac{1}{n}$ $\quad p = 1 \le 1$ diverges (Harmonic)

$C)\quad \sum_{n=1}^{\infty} \frac{1}{n^{1/3}}$ $\quad p = \frac{1}{3} \le 1$ diverges

$D)\quad \sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$ $\quad p = \frac{3}{2} > 1$ converges

$E)\quad \sum_{n=1}^{\infty} \frac{1}{n^{5/2}}$ $\quad p = \frac{5}{2} > 1$ converges

$F)\quad \sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$ $\quad p = \frac{1}{2} \le 1$ diverges