Series — Nth-term test

Name: _____ Date: _____

Find $\lim a_n$. Not 0: the series diverges. 0: the test says nothing.

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

$\lim_{n\to\infty} \frac{-2n-3}{2n+1} = \lim_{n\to\infty} \frac{-2-3/n}{2+1/n}$

$= \frac{-2+0}{2+0} = -1$

$\lim a_n \neq 0$, so the series diverges

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

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

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

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

6. $\sum_{n=1}^{\infty} \frac{-2n-2}{2n^2+1}$

Series · Nth-term test — Answer key

1. $\infty\sum n = 1\frac{-2n-3}{2n+1}$ → diverges

2. $\infty\sum n = 1\frac{2n+3}{2n-1}$ → diverges

3. $\infty\sum n = 1\frac{-2n}{2n^2+1}$ → the test says nothing

4. $\infty\sum n = 1\frac{2n^2+2}{2n^2+1}$ → diverges

5. $\infty\sum n = 1\frac{-1}{n^2+n+3}$ → the test says nothing

6. $\infty\sum n = 1\frac{-2n-2}{2n^2+1}$ → the test says nothing