Series — P-series and comparison

Name: _____ Date: _____

Does each series converge? Compare it with a p-series, $\sum 1/n^p$.

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

Compare with the p-series $\sum \frac{1}{n^2}$ with $p = 2$

$\frac{a_n}{b_n} = \frac{2n^2}{n^2 + 2} \to 2 > 0$, and finite

$\sum \frac{1}{n^2}$ converges, so this series converges

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

3 $\sum_{n=1}^{\infty} \frac{2}{\sqrt{n}}$

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

5 $\sum_{n=1}^{\infty} \frac{3}{n\sqrt{n}}$

6 $\sum_{n=1}^{\infty} \frac{n + 1}{2n^3 + 1}$

Series · P-series and comparison — Answer key

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

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

3. $\sum_{n=1}^{\infty} \frac{2}{\sqrt{n}}$ → diverges

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

5. $\sum_{n=1}^{\infty} \frac{3}{n\sqrt{n}}$ → converges

6. $\sum_{n=1}^{\infty} \frac{n+1}{2n^3+1}$ → converges