

Section 9.3

After viewing the lecture videos and reading the textbook, you should be able to answer the following questions:

A **p -series** is a series that can be written in the form $\sum_{k=1}^{\infty} \left(\frac{1}{k^p}\right) = 1 + \frac{1}{2^p} + \frac{1}{3^p} + \dots + \frac{1}{k^p} + \dots$ (where $p > 0$). It converges if $p > 1$ and diverges if $0 < p \leq 1$.

1. Which of the following are a constant times a p -series? If they are a constant times a p -series, what is p and does the series converge or diverge?
 - a. $\sum_{k=3}^{\infty} (5 \cdot 2^{2k}) = 320 + 1280 + 5120 + 20480 + \dots$
 - b. $\sum_{k=1}^{\infty} \left(\frac{1}{3k^5}\right) = \frac{1}{3} + \frac{1}{96} + \frac{1}{729} + \dots + \frac{1}{3k^5} + \dots$