

### Quiz 22, March 23, 2016

Does the series  $\sum_{n=1}^{\infty} \frac{1}{2\sqrt{n} + \sqrt[3]{n}}$  converge? Justify your answer.

**Answer:** We see that  $2\sqrt{n} + \sqrt[3]{n} < 3\sqrt{n}$ ; hence  $\frac{1}{3\sqrt{n}} < \frac{1}{2\sqrt{n} + \sqrt[3]{n}}$ . We know that  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$  is the  $p$ -series with  $p = \frac{1}{2} < 1$ ; hence  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$  diverges. It follows that  $\sum_{n=1}^{\infty} \frac{1}{3\sqrt{n}}$  also diverges. Use

part (b) of the comparison test to see that  $\sum_{n=1}^{\infty} \frac{1}{2\sqrt{n} + \sqrt[3]{n}}$  diverges.