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Quiz 11

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(5 marks)* §8.2 #39 If the nth partial sum of a series $\sum_{n=1}^{\infty} a_n$ is

$$s_n = \frac{n-1}{n+1}$$

find a_n and $\sum_{n=1}^{\infty} a_n$.

$$S_n = a_1 + a_2 + a_3 + \cdots + a_{n-1} + a_n$$

$$S_{n-1} = a_1 + a_2 + a_3 + \cdots + a_{n-1}$$

$$a_n = S_n - S_{n-1} = \frac{n-1}{n+1} - \left[\frac{n-2}{n}\right]$$

$$S = \lim_{n \to \infty} S_n$$

$$= \lim_{n \to \infty} \left[\frac{n-1}{n+1}\right] = 1$$

Question 2. *(4 marks)* §8.3 #27 Determine whether the series is convergent or divergent

$$\sum_{n=1}^{\infty} \frac{2+(-1)^n}{n\sqrt{n}} \qquad \text{Let} \quad a_n = \frac{2+(-1)^n}{n\sqrt{n}}$$

$$a_n = \frac{2+(-1)^n}{n\sqrt{n}} \leq \frac{2+1}{n\sqrt{n}} = \frac{3}{n^{3/2}} = b_n$$

$$\sum b_n \text{ converges since } p\text{-series where } p = \frac{3}{2} > 1$$

By the comparison test the series $\sum a_n$ converges.