Problem 1

Use the preliminary test to decide whether the following series are divergent or require further testing. *Careful:* Do *not* say that a series is convergent; the preliminary test cannot decide this.

$$\frac{1}{2} - \frac{4}{5} + \frac{9}{10} - \frac{16}{17} + \frac{25}{26} - \frac{36}{37} + \cdots$$

Solution

Write the terms of the series as decimals.

$$0.5 - 0.8 + 0.9 - 0.941 + 0.962 - 0.973 + \cdots$$

Since they tend to 1 as opposed to 0 in magnitude, the series diverges by the preliminary test.