

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Find the sum of the geometric series $2 - \frac{4}{5} + \frac{8}{25} - \frac{16}{125} + \frac{32}{625} - \dots$.

$$S = a + ar + ar^2 + ar^3 + \dots + ar^{n-1} + \dots$$

$$\underline{a = 2}$$

$$\underline{r = -\frac{2}{5}}$$

$$\frac{a}{1-r} \rightarrow \frac{2}{1 + \frac{2}{5}}$$

$$\downarrow$$

$$\frac{2}{\frac{7}{5}} \leftarrow \frac{2}{\frac{7}{5}}$$

$$\boxed{\frac{10}{7}}$$

2. Find the first 4 partial sums of the series $\sum_{n=1}^{\infty} \frac{1}{n^2 - 2n + 3}$.

$$S_1 = \frac{1}{1^2 - 2(1) + 3} = \boxed{\frac{1}{2}}$$

$$S_2 = \frac{1}{2} + \left[\frac{1}{2^2 - 2(2) + 3} \right] = \boxed{\frac{5}{6}}$$

$$S_3 = \frac{5}{6} + \left[\frac{1}{3^2 - 2(3) + 3} \right] = \boxed{1}$$

$$S_4 = 1 + \left[\frac{1}{4^2 - 2(4) + 3} \right] = \boxed{\frac{12}{11}}$$

Excellent!