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

1. Write the first 4 partial sums for the series $\sum_{n=1}^{\infty} \frac{3}{n^3}$, approximated to the nearest thousandth.

$$S_1 = \frac{3}{1^3} = \boxed{3}$$

$$S_2 = 3 + \frac{3}{2^3} = \boxed{3.375}$$

$$S_3 = 3 + \frac{3}{8} + \frac{3}{3^3} = \boxed{3.486}$$

$$S_4 = 3 + \frac{3}{8} + \frac{1}{9} + \frac{3}{4^3} = \boxed{3.533}$$

2. Evaluate $\sum_{n=1}^{\infty} \frac{2}{5^n}$.

$$S = \frac{a}{1-r}$$

$$S = \frac{2}{5} + \frac{2}{25} + \frac{2}{125} + \frac{2}{625} + \ldots + \frac{2}{5^n}$$

$$a = \frac{2}{5}$$

$$r = \frac{1}{5}$$

$$S = \frac{a}{1-r} \qquad S = \frac{\left(\frac{2}{5}\right)}{1-\left(\frac{1}{5}\right)} = \frac{\left(\frac{2}{5}\right)}{\left(\frac{4}{5}\right)} = \frac{1}{2}$$

$$\boxed{S = \frac{1}{2}}$$

Great