

Each question is worth 5 points. Show good justification for full credit. Don't panic.

1. Find, correct to at least 4 decimal places, the first three partial sums of the series

$$\sum_{n=1}^{\infty} \frac{1}{n^3}$$

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

$$\frac{1}{1^3} + \frac{1}{2^3} = \frac{9}{8} = 1.12500$$

$$\frac{1}{1^3} + \frac{1}{2^3} + \frac{1}{3^3} = \frac{251}{216} = 1.16204$$

Great

2. Determine the exact sum of the geometric series

$$\sum_{n=0}^{\infty} a \cdot r^n = \frac{a}{1-r} \quad 5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$$

$$\begin{aligned} a \cdot r^0 &= 5 \\ a &= 5 \end{aligned} \quad = \frac{5}{1 - (-\frac{2}{3})}$$

$$\begin{aligned} 5 \cdot r^1 &= -\frac{10}{3} \\ r &= -\frac{10}{3} \times \frac{1}{5} \end{aligned} \quad = \frac{5}{\frac{5}{3}}$$

$$\begin{aligned} &= -\frac{2}{3} \\ &= 5 \times \frac{3}{5} \end{aligned}$$

$$|r| < 1 \quad = \underline{3}$$

Great