

Each problem is worth 5 points. For full credit provide proper justification for your answer.

1. Find the sum of the series $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \dots$

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

$$S = \frac{1}{1 + \frac{1}{2}} = \frac{2}{3}$$

If you add these together $S = 0.6875$

where

$$a = 1$$

$$r = -\frac{1}{2}$$

Nice Job!

2. Express the sum $5 + 10 + 20 + 40 + \dots + 5 \cdot 2^n$ in terms of n .

finite geo series

$$\text{Common ratio } (r) = \frac{10}{5} = 2$$

$$\text{First term } (a) = 5$$

$$\sum_{n=0}^n 5 \cdot 2^n$$

we have,

$$S = \frac{a(1-r^{n+1})}{1-r} \quad \text{for finite geo series}$$

$$= \frac{5(1-2^{n+1})}{1-2}$$

$$S = -5(1-2^{n+1})$$

Excellent