MATH 242 - Quiz 7 REMIX

04/04/2024

1. **[5 pts]** Find S the sum of the series:

$$S = \sum_{n=1}^{\infty} \left(\frac{-2}{2n^2 + n} \right)$$

Not telescoping

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

$$= \frac{-1}{n\left(n+\frac{1}{2}\right)} = \frac{A}{n} + \frac{B}{n+\frac{1}{2}}$$

$$-1 = A\left(n+\frac{1}{2}\right) + Bn$$

$$-2 = A$$

$$2 = B$$

$$\sum_{n=1}^{\infty} \left(\frac{2}{n+\frac{1}{2}} - \frac{2}{n} \right)$$

or $\frac{4}{2n+1}$

2. **[5 pts]** Find S the sum of the series:

$$S = \sum_{n=1}^{\infty} \frac{2}{5}\left(\frac{3^{n+1}}{2^{3n}}\right)$$

$\times \frac{3}{8}$

$= \frac{2}{5} \cdot \frac{9}{8} + \frac{2}{5} \cdot \frac{27}{64}$

$\frac{9}{1-r} = \frac{\frac{2}{5} \cdot \frac{9}{8}}{1 - \frac{3}{8}} \cdot \frac{8}{8}$

$\frac{\frac{2}{5} \cdot 9}{8 - 3} = \frac{\frac{18}{5}}{5} = \boxed{\frac{18}{25}}$