<u>Mart Ayı Sorusunun Çözümü</u>

Öncelikle $1+\frac{1}{k^2}+\frac{1}{(k+1)^2}$ ifadesini biraz düzenleyelim.

$$1+\frac{1}{k^2}+\frac{1}{(k+1)^2}=\frac{k^2(k+1)^2+(k+1)^2+k^2}{k^2(k+1)^2}$$

$$=\frac{k^2(k+1)^2+k^2+2k+1+k^2}{k^2(k+1)^2}$$

$$=\frac{k^2(k+1)^2+2k^2+2k+1}{k^2(k+1)^2}$$

$$=\frac{k^2(k+1)^2+2k(k+1)+1}{k^2(k+1)^2}$$

$$=\frac{(k(k+1))^2+2k(k+1)+1}{k^2(k+1)^2}$$

$$=\frac{(k(k+1)+1)^2}{k^2(k+1)^2}$$

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

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

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

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

Bu durumda serimiz

$$\sum_{k=1}^{n}\left(1+\frac{1}{k}-\frac{1}{(k+1)}\right)=\left(1+\frac{1}{1}-\frac{1}{2}\right)+\left(1+\frac{1}{2}-\frac{1}{3}\right)+\cdots+\left(1+\frac{1}{n}-\frac{1}{(n+1)}\right)$$

$$=n+1-\frac{1}{n+1}$$

$$=\frac{n^2+2n}{n+1}$$

olur.