Ayudantía Matemáticas Avanzadas I N.5

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7 de Abril 2022

1. $\displaystyle\sum_{k=50}^{100} 2(k+4)$

2. $\displaystyle\sum_{k=3}^{50} \ln\left(\frac{k}{k+1}\right)$

3. $\displaystyle\sum_{k=1}^{n} k(k+2)$

4. $\displaystyle\sum_{k=1}^{n} k(k+1)(k+2)$

5. $\displaystyle\sum_{k=3}^{n} \frac{2}{k^2 + 2k}$

6. Calcular $\displaystyle\sum_{k=1}^{100} a_k$, donde $(a_k)_{k\in\mathbb{N}}$ es la sucesión definida por:

$$a_k = \begin{cases} \dfrac{3 - 2^k}{4} & \text{si } 1 \leq k \leq 50 \\ \sqrt{k+2} - \sqrt{k} & \text{si } k > 50 \end{cases}$$

7. **Bonus**, dado $0 < p < 1$, determine $w \in \mathbb{R}$ tal que:

$$\sum_{k=1}^{n} w(1-p)^{k-1} = 1$$

Fórmulas

1. $\displaystyle\sum_{k=1}^{n} 1 = n$

2. $\displaystyle\sum_{k=1}^{n} c = nc$, *donde* $c \in \mathbb{R}$

3. $\displaystyle\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$

4. $\displaystyle\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$

5. $\displaystyle\sum_{k=1}^{n} k^3 = \left(\frac{n(n+1)}{2}\right)^2$

6. $\displaystyle\sum_{k=m-l}^{n-l} a_{k+l} = \sum_{k=m}^{n} a_k = \sum_{k=m+l}^{n+l} a_{k-l}$, *con* $l \le m < n$.

7. $\displaystyle\sum_{k=1}^{n} r^k = \frac{r(1-r^n)}{1-r}$, donde $c \in \mathbb{R} - \{1\}$

8. $\displaystyle\sum_{k=m}^{n} (a_k - a_{k+1}) = a_m - a_{n+1}$, con $1 \le m \le n$. *(Propiedad Telescópica)*

9. $\displaystyle\sum_{k=m}^{n} a_k = \sum_{k=1}^{n} a_k - \sum_{k=1}^{m-1} a_k$, *con* $1 \le m < n$.

10. $\displaystyle\sum_{k=1}^{n} a_k = \sum_{k=1}^{m} a_k + \sum_{k=m+1}^{n} a_k$, *con* $1 \le m < n$.