

Ejercicio 5

Calcula el término general y la suma de los 8 primeros términos de las siguientes progresiones aritméticas:

a) 2, 6, 10, 14, ...

c) 50, 40, 30, 20, ...

b) $\frac{1}{10}, \frac{1}{5}, \frac{3}{10}, \frac{2}{5}, \dots$

d) $\frac{5}{3}, \frac{7}{3}, \frac{1}{3}, \frac{11}{3}, \dots$

Solución.

$$S_n = \frac{a_1 + a_n}{2} \cdot n = \frac{a_1 + a_1 + (n-1) \cdot d}{2} \cdot n$$
$$\Rightarrow S_n = a_1 n + \frac{(n-1) \cdot d}{2} \cdot n \Rightarrow S_8 = 8a_1 + \frac{7d}{2} \cdot 8 \Rightarrow \boxed{S_8 = 8a_1 + 28d}$$

a) 2, 6, 10, 14, ...

$$\begin{cases} a_1 = 2 \\ d = 4 \end{cases} \Rightarrow S_8 = 8a_1 + 28d = 8 \cdot 2 + 28 \cdot 4 = 16 + 112 \cdot 4 \Rightarrow \boxed{S_8 = 128}$$

$$a_n = a_1 + (n-1) \cdot d = 2 + (n-1) \cdot 4 \Rightarrow \boxed{a_n = 4n - 2}$$

b) $\frac{1}{10}, \frac{1}{5}, \frac{3}{10}, \frac{2}{5}, \dots$

$$\begin{cases} a_1 = \frac{1}{10} \\ d = \frac{1}{5} - \frac{1}{10} = \frac{1}{10} \end{cases} \Rightarrow S_8 = 8a_1 + 28d = 8 \cdot \frac{1}{10} + 28 \cdot \frac{1}{10} \Rightarrow \boxed{S_8 = \frac{18}{5}}$$

$$a_n = a_1 + (n-1) \cdot d = \frac{1}{10} + (n-1) \cdot \frac{1}{10} \Rightarrow \boxed{a_n = \frac{n}{10}}$$

c) 50, 40, 30, 20, ...

$$\begin{cases} a_1 = 50 \\ d = 40 - 50 = -10 \end{cases} \Rightarrow S_8 = 8a_1 + 28d = 8 \cdot 50 + 28 \cdot (-10) \Rightarrow \boxed{S_8 = 120}$$

$$a_n = a_1 + (n-1) \cdot d = 50 + (n-1) \cdot (-10) \Rightarrow \boxed{a_n = 60 - 10n}$$

d) $\frac{5}{3}, \frac{7}{3}, \frac{1}{3}, \frac{11}{3}, \dots$

$$\begin{cases} a_1 = \frac{5}{3} \\ d = \frac{7}{3} - \frac{5}{3} = \frac{2}{3} \end{cases} \Rightarrow \text{No es una progresión aritmética porque } \frac{7}{3} + \frac{2}{3} = 3 \neq \frac{1}{3}$$

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