



1 Determina cuáles de las siguientes sucesiones son aritméticas. Si la sucesión es aritmética, encuentra la diferencia y el término n -ésimo para cada sucesión.

- a) 2, 7, 12, 17, 22, 27, ...
- b) 10, 4, -2, -8, -14, ...
- c) $\frac{5}{2}, \frac{11}{6}, \frac{7}{6}, \frac{1}{2}, -\frac{1}{6}, ...$
- d) $e^1, e^2, e^3, e^4, e^5, ...$
- e) $\frac{13}{6}, \frac{17}{12}, \frac{2}{3}, ...$

Handwritten solutions for problem 1:

a) $2, 7, 12, 17, 22, 27$
 $\begin{matrix} 2 & 7 & 12 & 17 & 22 & 27 \\ - & - & - & - & - & - \\ & 5 & 5 & 5 & 5 & 5 \end{matrix}$
 $d = 5$

b) $10, 4, -2, -8, -14$
 $\begin{matrix} 10 & 4 & -2 & -8 & -14 \\ - & - & - & - & - \\ & -6 & -6 & -6 & -6 \end{matrix}$
 $d = -6$

c) $\frac{5}{2}, \frac{11}{6}, \frac{7}{6}, \frac{1}{2}, -\frac{1}{6}$
 $\begin{matrix} \frac{5}{2} & \frac{11}{6} & \frac{7}{6} & \frac{1}{2} & -\frac{1}{6} \\ - & - & - & - & - \\ & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} & -\frac{1}{6} \end{matrix}$
 $d = -\frac{1}{6}$

d) e^1, e^2, e^3, e^4, e^5
 $\begin{matrix} e^1 & e^2 & e^3 & e^4 & e^5 \\ - & - & - & - & - \\ & e & e & e & e \end{matrix}$
 $d = e$

e) $\frac{13}{6}, \frac{17}{12}, \frac{2}{3}$
 $\begin{matrix} \frac{13}{6} & \frac{17}{12} & \frac{2}{3} \\ - & - & - \\ & \frac{1}{12} & \frac{1}{12} \end{matrix}$
 $d = \frac{1}{12}$

2 Identifica cuáles sucesiones son aritméticas. Luego escribe los cinco primeros términos de aquellas que lo sean.

- a) $a_n = 4 - n$
- b) $\{a_n = \frac{2}{n+2}\}$
- c) $\{a_n = -n + 8\}$
- d) $a_n = n + \frac{\pi}{2}$
- e) $a_n = \frac{1}{2 + \pi}$
- f) $a_n = -\frac{2}{3}(n-1) + 2$

Handwritten solutions for problem 2:

a) $a_n = 4 - n$
 $\begin{matrix} 4-1=3 \\ 4-2=2 \\ 4-3=1 \\ 4-4=0 \\ 4-5=-1 \end{matrix}$

b) $\{a_n = \frac{2}{n+2}\}$
 $\begin{matrix} \frac{2}{4} = 0,5 \\ \frac{2}{5} = 0,4 \\ \frac{2}{6} = 0,33 \\ \frac{2}{7} = 0,28 \\ \frac{2}{8} = 0,25 \end{matrix}$

c) $\{a_n = -n + 8\}$
 $\begin{matrix} -1+8=7 \\ -2+8=6 \\ -3+8=5 \\ -4+8=4 \\ -5+8=3 \end{matrix}$

d) $a_n = n + \frac{\pi}{2}$
 $\begin{matrix} 1 + \frac{\pi}{2} = 1,5 + \pi \\ 2 + \frac{\pi}{2} = 2,5 + \pi \\ 3 + \frac{\pi}{2} = 3,5 + \pi \\ 4 + \frac{\pi}{2} = 4,5 + \pi \\ 5 + \frac{\pi}{2} = 5,5 + \pi \end{matrix}$

e) $a_n = \frac{1}{2 + \pi}$
 $\frac{1}{2 + \pi} = 0,14159265$

f) $a_n = -\frac{2}{3}(n-1) + 2$
 $\begin{matrix} -\frac{2}{3}(1-1) + 2 = 2 \\ -\frac{2}{3}(2-1) + 2 = 1,33 \\ -\frac{2}{3}(3-1) + 2 = 0,66 \\ -\frac{2}{3}(4-1) + 2 = 0 \\ -\frac{2}{3}(5-1) + 2 = -0,66 \end{matrix}$

$$\textcircled{b} \sum_{n=1}^{10} \frac{1}{\sqrt{n}} - \frac{1}{\sqrt{n+1}} = \left(\frac{1}{\sqrt{1}} - \frac{1}{\sqrt{1+1}} \right) + \left(\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2+1}} \right) + \left(\frac{1}{\sqrt{3}} - \frac{1}{\sqrt{3+1}} \right) + \dots + \left(\frac{1}{\sqrt{9}} - \frac{1}{\sqrt{9+1}} \right)$$

$$\left(\frac{1}{\sqrt{5}} - \frac{1}{\sqrt{5+1}} \right) + \left(\frac{1}{\sqrt{6}} - \frac{1}{\sqrt{6+1}} \right) + \left(\frac{1}{\sqrt{7}} - \frac{1}{\sqrt{7+1}} \right) + \left(\frac{1}{\sqrt{8}} - \frac{1}{\sqrt{8+1}} \right) + \left(\frac{1}{\sqrt{9}} - \frac{1}{\sqrt{9+1}} \right)$$

$$\left(\frac{1}{\sqrt{10}} - \frac{1}{\sqrt{10+1}} \right) = 1 - \frac{\sqrt{11}}{11}$$

$$H \sum_{n=1}^7 \left(1 + \frac{2}{n} \right)^n = \left(1 + \frac{2}{1} \right)^1 + \left(1 + \frac{2}{2} \right)^2 + \left(1 + \frac{2}{3} \right)^3 + \left(1 + \frac{2}{3} \right)^4 + \left(1 + \frac{2}{4} \right)^5$$

$$\left(1 + \frac{2}{3} \right)^6 + \left(1 + \frac{2}{6} \right)^7 + \left(1 + \frac{2}{7} \right)^8 = 3 + (1+1) + \frac{5}{3} + \frac{3}{2} + \frac{1}{5} + \frac{1}{3}$$

$$= 3 + 2 + \frac{5}{3} + \frac{3}{2} + \frac{7}{5} + \frac{4}{3} + \frac{9}{7} = 5 + \frac{503}{70} = \frac{853}{70}$$

3 Halla la suma de los diez primeros términos de cada sucesión.

a $a_n = 5^n - 5^{n-1}$
 c $a_n = n2^{n-1}$
 e $a_n = 2n(2n-1)$

b $a_n = \frac{1}{n(n+1)(n+2)}$
 d $a_n = \left(\frac{1}{4}\right)^n + 3^{\frac{n}{3}}$
 f $a_n = n! - (n-1)!$

$A = 4 + 20 + 100 + 500 + 2.500 + 12.500 + 62.500 + 312.500 + 1.562.500 + 7.812.500 = 9.765.624$
 $B = 1/6 + 1/24 + 1/60 + 1/120 \dots + 1/320 = 65/240$
 $C = 1 + 4 + 12 + 32 + 80 \dots + 5120 = 9217$
 $D = 1/4 + 3/3 + 1/16 + 3$
 $E = 2 + 12 + 30 + 56 \dots + 380 = 1430$
 $F = 1 + 2 + 2 + 4 + 4 \dots + 1316818944000 = 1331657196939$