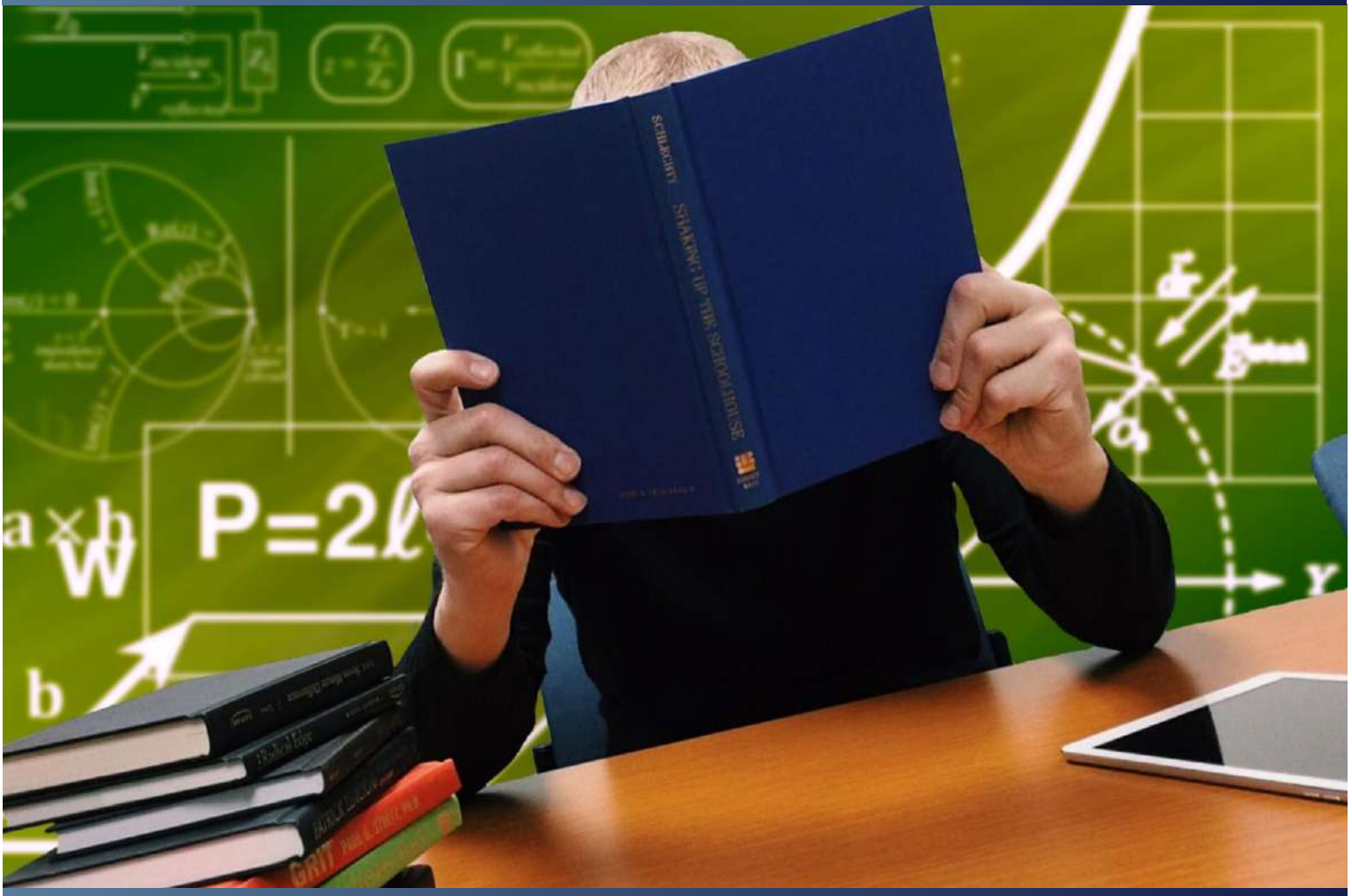
Ejercicios y Talleres



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SERIES NUMERICAS

EJERCICIOS

Hallar el valor de cada expresión.

a. $\sum_{K=1}^{7} k =$

b. $\sum_{K=5}^{10} 2k =$

c. $\sum_{K=2}^{8} \left(k^2 - 1\right) =$

d. $\sum_{K=1}^{5} \left[(k+1)^2 - k^2\right] =$

e. $\sum_{K=1}^{6} \left[sen \frac{\pi k}{2} \right] =$

f. $\sum_{K=5}^{10} \left(e^{k+1} - e^{k}\right) =$

g. $\sum_{K=2}^{10} (k-2)^2 =$

h. $\sum_{K=0}^{7} \left(k^2 - k + 1\right) =$

i. $\sum_{K=1}^{5} \left(\frac{1}{k}\right)^2 =$

j. $\sum_{K=0}^{7} \frac{k^2}{3} =$

k. $\sum_{K=1}^{5} \frac{1}{2k-1} =$

l. $\sum_{K=0}^{4} \frac{(-1)^k}{2k-1} =$

EJERCICIOS

Hallar:

1. $\lim_{x\to\infty} \dfrac{6x^2+2x+1}{6x^2-3x+4} \Rightarrow$

2. $\lim_{x\to\infty} \dfrac{x^2+x-2}{4x^3-1} \Rightarrow$

3. $\lim_{x\to\infty} \dfrac{2x^3}{x^2+1} \Rightarrow$

4. $\lim_{x\to 3} \dfrac{x^2-2x}{x+1} \Rightarrow$

5. $\lim_{x\to 0} \dfrac{6x-2}{x^3-12x-1} \Rightarrow$

6. $\lim_{x\to -1} \dfrac{x^2-1}{x^2-x-2} \Rightarrow$

Series numéricas

a) $\sum_{k=1}^{7} k = 1+2+3+4+5+6+7 = 28$

b) $\sum_{k=5}^{10} 2k = 2\cdot 5 + 2\cdot 6 + 2\cdot 7 + 2\cdot 8 + 2\cdot 9 + 2\cdot 10 = 10+12+14+16+18+20$
$= 90$

c) $\sum_{k=2}^{8} (k^2-1) = (2^2-1)+(3^2-1)+(4^2-1)+(5^2-1)+(6^2-1)+(7^2-1)+(8^2-1)$

$= 3+8+15+24+35+48+63 = 196$

d) $\sum_{k=1}^{5} [(k+1)^2 - k^2] = [(1+1)^2-1^2]+[(2+1)^2-2^2]+[(3+1)^2-3^2]$
$+[(4+1)^2-4^2]+[(5+1)^2-5^2]$

$= [4-1]+[9-4]+[16-9]+[25-16]+[36-25]$
$= 3+5+7+9+11 = 35$

e) $\sum_{k=1}^{6} \left[\operatorname{sen}\frac{\pi k}{2}\right] = \operatorname{Sen}\frac{\pi}{2} + \operatorname{Sen}\frac{2\pi}{2} + \operatorname{Sen}\frac{3\pi}{2} + \operatorname{Sen}\frac{4\pi}{2} + \operatorname{Sen}\frac{5\pi}{2}$
$+\operatorname{Sen}\frac{6\pi}{2}$
$= 1 + 0 + -1 + 0 + 1 + 0 = 1$

f) $\sum_{k=5}^{10} (e^{k+1} - e^k) = (e^6-e^5)+(e^7-e^6)+(e^8-e^7)+(e^9-e^8)$
$+(e^{10}-e^9)+(e^{11}-e^{10})$
$= e^6 - e^5 + e^7 - e^6 + e^8 - e^7 + e^9 - e^8 + e^{10} - e^9 + e^{11} - e^{10}$
$= -e^5 + e^{11} = 59725,73$

g) $\sum_{k=2}^{10} (k-2)^2 = (2-2)^2+(3-2)^2+(4-2)^2+(5-2)^2+(6-2)^2+(7-2)^2+(8-2)^2$
$+(9-2)^2+(10-2)^2 = 0+1+4+9+16+25+36+49+64$
$= 204$

h) $\sum_{k=0}^{7} (k^2-k+1) = (0^2-0+1)+(1^2-1+1)+(2^2-2+1)+(3^2-3+1)+$
$(4^2-4+1)+(5^2-4+1)+(6^2-6+1)+(7^2-7+1)$

$= 1+1+3+7+13+22+31+43 = 121$

i) $\sum_{k=1}^{5}\left(\frac{1}{k}\right)^2 = \left(\frac{1}{1}\right)^2+\left(\frac{1}{2}\right)^2+\left(\frac{1}{3}\right)^2+\left(\frac{1}{4}\right)^2+\left(\frac{1}{5}\right)^2$

$= 1^2+\frac{1}{4}+\frac{1}{9}+\frac{1}{16}+\frac{1}{25} = 1,46368111$

j) $\sum_{k=0}^{7}\frac{k^2}{3} = \frac{0^2}{3}+\frac{1^2}{3}+\frac{2^2}{3}+\frac{3^2}{3}+\frac{4^2}{3}+\frac{5^2}{3}+\frac{6^2}{3}+\frac{7^2}{3}$

$= \frac{0+1+4+9+16+25+36+49}{3} = \frac{140}{3} = 46,\overline{6}$

k) $\sum_{k=1}^{5}\frac{1}{2k-1} = \frac{1}{2\cdot1-1}+\frac{1}{2\cdot2-1}+\frac{1}{2\cdot3-1}+\frac{1}{2\cdot4-1}+\frac{1}{2\cdot5-1}$

$\frac{1}{1}+\frac{1}{3}+\frac{1}{5}+\frac{1}{7}+\frac{1}{9} = 1,7873$

l) $\sum_{k=0}^{4}\frac{(-1)^k}{2k-1} = \frac{(-1)^0}{2\cdot0-1}+\frac{(-1)^1}{2\cdot1-1}+\frac{(-1)^2}{2\cdot2-1}+\frac{(-1)^3}{2\cdot3-1}+\frac{(-1)^4}{2\cdot4-1}$

$= \frac{1}{-1}+\frac{-1}{1}+\frac{1}{3}+\frac{-1}{5}+\frac{1}{7} = -1,7238$

Ejercicios de límites

1. $\lim_{x\to\infty}\frac{6x^2+2x+1}{6x^2-3x+4} = \lim_{x\to\infty}\frac{\frac{6x^2}{x^2}+\frac{2x}{x^2}+\frac{1}{x^2}}{\frac{6x^2}{x^2}-\frac{3x}{x^2}+\frac{4}{x^2}} = \lim_{x\to\infty}\frac{6+\frac{2}{x}+\frac{1}{x^2}}{6-\frac{3}{x}+\frac{4}{x^2}}$ (0)

$= = \frac{6}{6} = 1$

2. $\lim_{x\to\infty}\frac{x^2+x-2}{4x^3-1} = \lim_{x\to\infty}\frac{\frac{x^2}{x^3}+\frac{x}{x^3}-\frac{2}{x^3}}{\frac{4x^3}{x^3}-\frac{1}{x^3}} = \lim_{x\to\infty}\frac{\frac{1}{x}+\frac{1}{x^2}-\frac{2}{x^3}}{4-\frac{1}{x^3}}$

$= \frac{0}{4} = 0$

3. $\lim_{x\to\infty}\frac{2x^3}{x^2+1} = \lim_{x\to\infty}\frac{\frac{2x^3}{x^3}}{\frac{x^2}{x^3}+\frac{1}{x^3}} = \lim_{x\to\infty}\frac{\frac{2}{1}}{\frac{1}{x}+\frac{1}{x^3}} = \frac{2}{0}$

Indeterminado

4. $\lim_{x\to3}\frac{x^2-2x}{x+1} = \frac{3^2-2\cdot3}{3+1} = \frac{9-6}{4} = \frac{3}{4}$

5. $\lim_{x \to 0} \frac{6x-2}{x^3-12x-1} = \frac{6 \cdot 0 - 2}{0^3 - 12 \cdot 0 - 1} = \frac{-2}{-1} = 2$

6. $\lim_{x \to -1} \frac{x^2-1}{x^2-x-2} = \frac{(-1)^2-1}{(-1)^2-(-1)-2} = \frac{1-1}{1+1-2} = \frac{0}{0}$

$\lim_{x \to -1} \frac{(x-1)(x+1)}{(x-2)(x+1)} = \lim_{x \to -1} \frac{x-1}{x-2} = \frac{-1-1}{-1-2} = \frac{-2}{-3} = \frac{2}{3}$