$a=0, b=3, c=4, d=3$

1.- Obten la suma de los primeros 5 términos de la siguiente serie:

1) $\left\{\frac{d+n}{n+1}+\frac{b+n}{n+2}+\frac{c+n}{n+3}\right\}$, Suma $= 19.8773...$

$$\frac{3+1}{1+1}+\frac{3+1}{1+2}+\frac{4+1}{1+3}=\frac{4}{2}+\frac{4}{3}+\frac{5}{4}=\frac{55}{12}=4.5833$$

$$\frac{3+2}{2+1}+\frac{3+2}{2+2}+\frac{4+2}{2+3}=\frac{5}{3}+\frac{5}{4}+\frac{6}{5}=\frac{247}{60}=4.1166$$

$$\frac{3+3}{3+1}+\frac{3+3}{3+2}+\frac{4+3}{3+3}=\frac{6}{4}+\frac{6}{5}+\frac{7}{6}=\frac{58}{15}=3.8666$$

$$\frac{3+4}{4+1}+\frac{3+4}{4+2}+\frac{4+4}{4+3}=\frac{7}{5}+\frac{7}{6}+\frac{8}{7}=\frac{779}{210}=3.7095$$

$$\frac{3+5}{5+1}+\frac{3+5}{5+2}+\frac{4+5}{5+3}=\frac{8}{6}+\frac{8}{7}+\frac{9}{8}=\frac{605}{168}=3.6012$$

$a=0, b=3, c=4, d=3$

11.- Dado $a_1 = c+1$, determina la suma de los primeros 5 términos de la siguiente sucesión definida recursivamente

$a_1 = 5$

2) $a_{n+1} = (d+1)a_n + (b+1)n + c$, Suma = 2737

$n=1$

$a_{1+1} = (3+1)5 + (3+1)1 + 4 =$

$a_2 = 4 \cdot 5 + 4 \cdot 1 + 4 =$

$a_2 = 20 + 4 + 4 =$

$a_2 = 28$

$n=2$

$a_{2+1} = (3+1)28 + (3+1)2 + 4 =$

$a_3 = 4 \cdot 28 + 4 \cdot 2 + 4 =$

$a_3 = 112 + 8 + 4 =$

$a_3 = 124$

$n=3$

$a_{3+1} = (3+1)124 + (3+1)3 + 4 =$

$a_4 = 4 \cdot 124 + 4 \cdot 3 + 4 =$

$a_4 = 496 + 12 + 4 =$

$a_4 = 512$

$n=4$

$a_{4+1} = (3+1)512 + (3+1)4 + 4 =$

$a_5 = 4 \cdot 512 + 4 \cdot 4 + 4 =$

$a_5 = 2,048 + 16 + 4 =$

$a_5 = 2,068$

$a_1 + a_2 + a_3 + a_4 + a_5 = 5 + 28 + 124 + 512 + 2068 = 2737$

$a=0, b=3, c=4, d=3$

III.- Calcula la sumatoria infinita indicada

3) $\sum_{i=1}^{\infty}\left(\frac{a+d+1}{a+b+c+d+2}\right)^{i}=$

$\sum_{i=1}^{\infty}\left(\frac{0+3+1}{0+3+4+3+2}\right)^{i}=$

$\sum_{i=1}^{\infty}\left(\frac{4}{12}\right)^{i}=\frac{r}{1-r}=\frac{\frac{4}{12}}{1-\frac{4}{12}}=\frac{\frac{4}{12}}{\frac{8}{12}}=\frac{1}{2}=\underline{0.5}$

IV.- Una pelota se deja caer desde una altura $H=35(a+b+c+d+2)m$, si después de cada rebote la altura máxima que alcanza es $\frac{90+c}{100}$ de su altura máxima anterior, determina la distancia total que recorre.

$H=35(0+3+4+3+2)m$
$H=35(12)m$
$H=420m$

$\frac{90+c}{100}=\frac{90+4}{100}=\frac{94}{100}=0.94$

4) $H_{TOT}=H+2H\left(\frac{r}{1-r}\right)$

$H_{TOT}=420+2(420)\left(\frac{0.94}{1-0.94}\right)$

$H_{TOT}=420+840\left(\frac{0.94}{0.06}\right)=$

$H_{TOT}=\underline{13,580m}$

$a=0, b=3, c=4, d=3$

V.- Aproxima la siguiente integral con la serie de McLaurin tomando los primeros 3 términos de la serie, donde:

$$K_1 = \frac{c+d+1}{10}, \quad K_2 = \frac{c+d+2}{10}$$

$$K_1 = \frac{8}{10}, \quad K_2 = \frac{9}{10}$$

$$5)\ (a+b+1)\int_{K_1}^{K_2} \frac{\ln(x+1)}{x}\,dx =$$

$$(0+3+1)\int_{0.8}^{0.9} \frac{\ln(x+1)}{x}\,dx =$$

$$4\int_{0.8}^{0.9} \frac{\ln(x+1)}{x}\,dx = 4\int_{0.8}^{0.9} \frac{\sum_{n=1}^{\infty} \frac{(-1)^{n+1}x^n}{n}}{x} =$$

$$4\int_{0.8}^{0.9} \frac{1}{x}\left(\frac{(-1)^{1+1}x^1}{1} + \frac{(-1)^{2+1}x^2}{2} + \frac{(-1)^{3+1}x^3}{3}\right)dx =$$

$$4\int_{0.8}^{0.9} \frac{1}{x}\left(x - \frac{x^2}{2} + \frac{x^3}{3}\right)dx =$$

$$4\int_{0.8}^{0.9}\left(1 - \frac{x}{2} + \frac{x^2}{3}\right)dx = x - \frac{x^2}{4} + \frac{x^3}{9}\Big| = 4\left(0.9 - \frac{0.9^2}{4} + \frac{0.9^3}{9} - \left(0.8 - \frac{0.8^2}{4} + \frac{0.8^3}{9}\right)\right) =$$

$$= 0.3264\ldots$$