Sumatoria doble

$$\sum_{i=1}^{100} \left[\sum_{\boxed{j}=2}^{100} i \times j \right]$$

$$\sum_{i=1}^{100} \left(2 \times i + 3i + 4i + 5i + 6i + 7i + \ldots + 100i \right)$$

$$\sum_{i=1}^{100} \left(\left(\sum_{j=1}^{100} j \right) - i \right) = \sum_{i=1}^{100} i \left(\frac{100(101)}{2} - 1 \right) = \sum_{i=1}^{100} 5049\, i = \boxed{5049 \times 5050}$$

$$\sum_{p=100}^{300}\sum_{k=-100}^{500} 2p\times k^2 = 2\sum_{p=100}^{300}\sum_{k=-100}^{500} p\times k^2 = 2\sum_{p=100}^{300} p\left(\sum_{k=1}^{500} k^2 + \sum_{k=1}^{100} k^2\right)$$

$$= 2\sum_{p=100}^{300} p\left(\frac{500(501)(1001) + 100(101)(201)}{6}\right)$$

$$\underbrace{}_{a}$$

$$= 2\sum_{p=100}^{300} ap = a\left(\sum_{p=1}^{300} p - \sum_{p=1}^{99} p\right)$$

$$= 2a\left(\frac{300(301) - 99(100)}{2}\right)$$

$$\sum_{i=100}^{1000} \sum_{j=10}^{300} i^j = \sum_{i=100}^{1000} \left(\frac{i^{301} - 1}{i - 1} \right) i$$

$\boxed{i \neq 1}$

$$i + i^2 + i^3 + i^4 + i^5 + \dots + i^n$$

$$\sum_{i=20}^{300} \sum_{j=10}^{200} (i - j^2)$$

$1,111367137619787 5 \times 10^{18}$

$$\sum_{i=-100}^{200} \sum_{j=200}^{300} \sum_{K=-20}^{80} (ijK - ij + i)$$

$$\sum_{i=20}^{300}\sum_{j=10}^{200}(i-j^2) = \sum_{i=20}^{300}\sum_{j=10}^{200} i - \sum_{i=20}^{300}\sum_{j=10}^{200} j^2$$

$$\sum_{i=20}^{300}\left(\sum_{j=1}^{200} i - \sum_{j=1}^{9} i\right) - \sum_{i=20}^{300}\left(\sum_{j=1}^{200} j^2 - \sum_{j=1}^{9} j^2\right)$$

$$\sum_{i=20}^{300}\big(\overbrace{200i - 9i}^{191i}\big) - \sum_{i=20}^{300}\left(\underbrace{\frac{200(201)(401) - 9(10)(19)}{6}}_{9}\right)$$

$$\sum_{i=1}^{300} 191i - \sum_{i=1}^{19} 191i - \left(\sum_{i=1}^{300} a - \sum_{i=1}^{19} a\right) = \frac{191(300)(301) - 191\times19\times20}{2} - \underbrace{3009 - 199}_{2819}$$

$$\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{K=-20}^{80}(ijK - ij + i)$$

$$\underbrace{\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{K=-20}^{80} ijK}_{1} - \underbrace{\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{K=-20}^{80} ij}_{2} + \underbrace{\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{K=-20}^{80} i}_{3}$$

1) $$\sum_{i=-100}^{200}\sum_{j=200}^{300} ij\left(\sum_{i=1}^{80} K - \sum_{i=1}^{20} K\right) = \sum_{i=-100}^{200}\sum_{j=200}^{300} ij\left(\underbrace{\frac{80\times 81 - 20(21)}{2}}_{c_1}\right).$$

$$C_1\sum_{i=-100}^{200} i\left(\sum_{j=1}^{300} j - \sum_{j=1}^{199} j\right) = C_1\sum_{i=-100}^{200} i\left(\underbrace{\frac{300(301) - 199(200)}{2}}_{c_{12}}\right) = C_1\times C_{12}\times\left(\sum_{i=1}^{200} i - \sum_{i=1}^{100} i\right) = C_1\times C_{12}\times\left(\frac{200(201) - 100(101)}{2}\right)$$

$$\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{k=-20}^{80} ij = \sum_{i=-100}^{200}\sum_{j=200}^{300} ij\left(\overset{i>0}{\sum_{k=1}^{80} 1} + \overset{i<0}{\sum_{k=1}^{20} 1} + \overset{i=0}{1}\right)$$

$$\sum_{i=-100}^{200}\sum_{j=200}^{300} ij(80+20+1) = 101\sum_{i=-100}^{200}\sum_{j=200}^{300} ij = 101\sum_{i=-100}^{200} i\sum_{j=200}^{300} j$$

$$= 101\sum_{i=-100}^{200} i\left(\sum_{j=1}^{300} j - \sum_{j=1}^{199} j\right) = 101\sum_{i=-100}^{200} i\left(\underbrace{\frac{300(301)-199(200)}{2}}_{C_2}\right)$$

$$101\times C_2\sum_{i=-100}^{200} i = 101\times C_2\left(\sum_{i=1}^{200} i - \sum_{i=1}^{100} i\right) = 101\times C_2\left(\frac{200(201)}{2} - \frac{100(101)}{2}\right)$$

$$\sum_{i=-100}^{200}\sum_{j=200}^{300}\sum_{k=-20}^{80} i = \sum_{i=-100}^{200}\sum_{j=200}^{300} i\left(\sum_{k=1}^{80} 1 + \sum_{k=1}^{20} 1 + 1\right)$$

$$\sum_{i=-100}^{200}\sum_{j=200}^{300} 101\, i = 101\sum_{i=-100}^{200} i \underbrace{\left(\sum_{j=1}^{300} 1 - \sum_{j=1}^{199} 1\right)}_{101}$$

$$= 101^2 \sum_{i=-100}^{200} i = 101^2\left(\sum_{i=1}^{200} i - \sum_{i=1}^{100} i\right) = 101^2 \times \left(\frac{200(201) - 100(101)}{2}\right)$$