

$$= -\frac{16}{n^2} (n+1) \left[n + \frac{2}{3} (2n+1) \right]$$

$$= -\frac{16}{n^2} (n+1) \left(\frac{3n + 4n + 2}{3} \right) = -\frac{16}{n^2} (n+1) \left(\frac{7n+2}{3} \right)$$

$$= -\frac{16}{3} \frac{(n+1)(7n+2)}{n^2} = -\frac{16}{3} \left(\frac{7n^2 + 9n + 2}{n^2} \right)$$

$$\lim_{n \rightarrow +\infty} S_n = \lim_{n \rightarrow +\infty} -\frac{16}{3} \left(\frac{7n^2 + 9n + 2}{n^2} \right) = \lim_{n \rightarrow +\infty} -\frac{16}{3} \left(\frac{7n^2}{n^2} \right)$$

$$S_n = -\frac{16}{3} \times 7 = -\frac{112}{3}$$

$$\text{donc } \boxed{\int_1^5 1 - n^2 \, dn = -\frac{112}{3}}$$

② Calculer l'intégrale à l'aide d'une primitive.

$$I = \int_1^5 1 - n^2 \, dn = \int_1^5 1 \, dn - \int_1^5 n^2 \, dn$$

$$= n \Big|_1^5 - \frac{n^3}{3} \Big|_1^5 = [5 - 1] - \left[\frac{5^3}{3} - \frac{1^3}{3} \right]$$

$$= 4 - \left[\frac{125}{3} - \frac{1}{3} \right] = 4 - \frac{124}{3} = -\frac{112}{3}$$

$$I = \int_1^5 1 - n^2 \, dn = -\frac{112}{3}$$