

Find the difference between the sum of the squares of the first one hundred natural numbers and the square of the sum.

$$\begin{aligned} \text{ex. } 1^2 + 2^2 + \dots + 10^2 &= 385 & \rightarrow 3025 - 385 = 2640 \\ (1 + 2 + \dots + 10)^2 &= 3025 \end{aligned}$$

sum of first n numbers is

$$\textcircled{1} \quad \frac{n(n+1)}{2}$$

sum of first n squares is

$$\textcircled{2} \quad \frac{n(n+1)(2n+1)}{6}$$

square expression 1 and subtract expression 2. Plug in 100.

$$\left(\frac{100(100+1)}{2} \right)^2 - \frac{100(100+1)(2 \cdot 100 + 1)}{6}$$