

$$\begin{aligned}
a) \sum_{i=1}^m (mi-1)^2 &= \sum_{i=1}^m (m^2 i^2 - 2im + 1) \\
&= m^2 \sum_{i=1}^n i^2 - 2m \sum_{i=1}^m i + \sum_{i=1}^m 1 \\
&= \frac{n^3(n+1)(2n+1)}{6} - \frac{2n^2(n+1)}{2} + m \\
&= \frac{n^3(n+1)(2n+1)}{6} - n^2(n+1) + m \\
&= \frac{n^3(n+1)(2n+1)}{6} - n(n^2+n-1) \\
&= \frac{n^3(2n^2+3n+1) - 6n^3 - 6n^2 + 6n}{6} \\
&= \frac{2n^5 + 3n^4 + n^3 - 6n^3 - 6n^2 + 6n}{6} \\
&= \frac{2n^5 + 3n^4 - 5n^3 - 6n^2 + 6n}{6} \\
&= \frac{n(2n^4 + 3n^3 - 5n^2 - 6n + 6)}{6} \\
&= \frac{n(n-1)(2n^3 + 5n^2 - 6)}{6}
\end{aligned}$$


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