Solution: $P^3 = \begin{bmatrix} 1 & 0 & 0 \\ 8 & 1 & 0 \\ 48 & 8 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 16 & 4 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 12 & 1 & 0 \\ 96 & 12 & 1 \end{bmatrix}$

Similarly,

$$P^n = \begin{bmatrix} 1 & 0 & 0 \\ 4n & 1 & 0 \\ 16\frac{n(n+1)}{2} & 4n & 1 \end{bmatrix}$$

$$\therefore P^{50} = \begin{bmatrix} 1 & 0 & 0 \\ 200 & 1 & 0 \\ 8 \cdot 50 \cdot 51 & 200 & 1 \end{bmatrix}$$

$$P^{50} - I = \begin{bmatrix} 0 & 0 & 0 \\ 200 & 0 & 0 \\ 8 \cdot 50 \cdot 51 & 200 & 0 \end{bmatrix}$$

$$\Rightarrow Q = \begin{bmatrix} 0 & 0 & 0 \\ 200 & 0 & 0 \\ 8 \cdot 50 \cdot 51 & 200 & 0 \end{bmatrix} \quad \therefore \frac{q_{31}+q_{32}}{q_{21}} = \frac{400 \cdot 51 + 200}{200} = 103$$

A 52

B 103

C 201

D 205

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