

```

K = PD[X[1, 4, 2, 5], X[3, 6, 4, 1], X[5, 2, 6, 3]]
PD[X[1, 4, 2, 5], X[3, 6, 4, 1], X[5, 2, 6, 3]]

SetAttributes[δ, Orderless];
Expand[
  Times@@K /. X[i_, j_, k_, l_] := A δ[i, j] δ[k, l] - A-1 δ[i, l] δ[j, k]
  ] // . δ[i_, j_] δ[j_, k_] := δ[i, k] /. δ[i_, i_] | δ[  ]2 := (-A2 - A-2)

$$\frac{3 \left(-\frac{1}{A^2} - A^2\right)}{A} - \frac{\left(-\frac{1}{A^2} - A^2\right)^2}{A^3} - 3 A \left(-\frac{1}{A^2} - A^2\right)^2 + A^3 \left(-\frac{1}{A^2} - A^2\right)^3$$

% // Simplify

$$\frac{(1 + A^4) (1 + 8 A^4 + 5 A^8 + A^{12})}{A^7}$$

δ[7, 5]
δ[5, 7]

```