

Find the coefficient of x^5 in the expansion of $(1+x^2)^5 \cdot x(1+x)^4$, ~~is 60~~.

Solution: Coefficient of x^5 in $(1+x^2)^5 \cdot x(1+x)^4$

$$= \text{Coefficient of } x^5 \text{ in } \left({}^5C_0 + {}^5C_1x^2 + {}^5C_2x^4 + {}^5C_3x^6 + \dots \right) \left({}^4C_0 + {}^4C_1x + {}^4C_2x^2 + \dots \right)$$

$$= {}^5C_1 {}^4C_3 + {}^5C_2 {}^4C_1$$

$$= 20 + 40$$

$$= \boxed{60}$$