question for practice Find the coefficient of x^n in the expansion of $(1 - 9x + 20x^2)^{-1}$.

Sol. We have,

$$(1 - 9x + 20x^2)^{-1} = [(1 - 5x)(1 - 4x)]^{-1}$$

$$= \frac{1}{(1 - 5x)(1 - 4x)} = \frac{5}{1 - 5x} - \frac{4}{1 - 4x}$$

$$= 5(1 - 5x)^{-1} - 4(1 - 4x)^{-1}$$

$$= 5[1 + 5x + (5x)^2 + \cdots + (5x)^n + \cdots] - 4[1 + 4x + (4x)^2 + \cdots + (4x)^n + \cdots]$$

Therefore the coefficient of x^n is $5^{n+1} - 4^{n+1}$.