

Example 3 Find the 4th term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^9$

Solution Since r^{th} term from the end in the expansion of $(a + b)^n$ is $(n - r + 2)^{\text{th}}$ term from the beginning. Therefore 4th term from the end is $9 - 4 + 2$, i.e., 7th term from the beginning, which is given by

$$T_7 = {}^9C_6 \left(\frac{x^3}{2}\right)^3 \left(\frac{-2}{x^2}\right)^6 = {}^9C_3 \frac{x^9}{8} \cdot \frac{64}{x^{12}} = \frac{9 \times 8 \times 7}{3 \times 2 \times 1} \times \frac{64}{x^3} = \frac{672}{x^3}$$

