

Find the term independent of x in the expansion $\left(2x - \frac{3}{x^2}\right)^6$

The term independent of x is the term without x in it

Let's look at the different possible powers of the two parts

$$(2x)^6 = 64x^6 \quad \left(-\frac{3}{x^2}\right)^0 = 1$$

$$(2x)^5 = 32x^5 \quad \left(-\frac{3}{x^2}\right)^1 = -\frac{3}{x^2}$$

$$(2x)^4 = 16x^4 \quad \left(-\frac{3}{x^2}\right)^2 = \frac{9}{x^4}$$

If we find the product of these terms then the x s cancel out

$$\begin{aligned} \text{Term} &= \binom{6}{4} \times (2x)^4 \times \left(-\frac{3}{x^2}\right)^2 \\ &= 15 \times 16x^4 \times \frac{9}{x^4} \\ &= 15 \times 16 \times 9 \\ &= 15 \times 16 \times 9 \\ &= 2160 \end{aligned}$$