Exercise 3

Paper 2 style · Graphic display calculator

3 5 marks SL 1.9 ●●● Demanding

Consider the expansion of $\left(x^2 + \frac{3}{x}\right)^6$.

(a) Write down the general term, simplifying the power of x. **[2]**

(b) Find the constant term. **[2]**

(c) Find the coefficient of x^3. **[1]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

$\binom{6}{r}\left(x^2\right)^{6-r}\left(\frac{3}{x}\right)^r$ (M1)

$=\binom{6}{r}3^r x^{12-3r}$ A1

Total 2 marks

MARKSCHEME (b)

$12-3r=0,\ r=4$ (M1)

$\binom{6}{4}\times 3^4=1215$ A1

Total 2 marks

MARKSCHEME (c)

$r=3$: $\binom{6}{3}\times 3^3=540$ A1

Total 1 mark