

11	2c	Find an expression for the coefficient of x^2 in the expansion of $\left(3x - \frac{4}{x}\right)^8$.	2
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Method 1:

$$\left(3x - \frac{4}{x}\right)^8 = \dots + \binom{8}{3}(3x)^5\left(-\frac{4}{x}\right)^3 + \dots \quad \therefore \binom{8}{3} \cdot 3^5 \cdot (-4)^3 = -870\,912$$

State Mean:

1.42/2

Method 2:

Using $\binom{8}{k}(3x)^{8-k}\left(\frac{4}{x}\right)^k$.

$$\therefore x^{8-k} \cdot (x^{-1})^k = x^2$$

$$\therefore 8 - k - k = 2$$

$$8 - 2k = 2$$

$$2k = 6$$

$$k = 3$$

$$\therefore \binom{8}{3} \cdot 3^5 \cdot (-4)^3 = -870\,912$$

* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

Most candidates were able to either quote the correct general term in the required expansion or determine that the term involving $x^5 \times \frac{1}{x^3}$ yielded the coefficient of x^2 .

Some candidates evaluated $\binom{8}{3}3^5(-4)^3$ incorrectly. Others omitted the negative

sign or the brackets in their expansion or in their evaluation of $\binom{8}{3}(3x)^5\left(-\frac{4}{x}\right)^3$.

Some candidates correctly found the value of r in the general term, but confusion with the subscripts led to the coefficient of a different term. A substantial number of candidates stated the term rather than the coefficient.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/