Finding a Single Term in the Expansion



Example

The coefficient of $x^{4}$ in the expansion of $\left(1+qx\right)^{10}$ is 3360. Find the possible value(s) of the constant $q$.

Test Your Understanding

In the expansion of $\left(1+ax\right)^{10}$, where $a$ is a non-zero constant the coefficient of $x^{3}$ is double the coefficient of $x^{2}$. Find the value of $a$.

Extension

1. *MAT 2014 1G]* Let $n$ be a positive integer. The coefficient of $x^{3}y^{5}$ in the expansion of $\left(1+xy+y^{2}\right)^{n}$ equals:
2. $n$
3. $2^{n}$
4. $\left(\begin{matrix}n\\3\end{matrix}\right)\left(\begin{matrix}n\\5\end{matrix}\right)$
5. $4\left(\begin{matrix}n\\4\end{matrix}\right)$
6. $\left(\begin{matrix}n\\8\end{matrix}\right)$
7. [STEP I 2013 Q6] By considering the coefficient of $x^{r}$ in the series for $\left(1+x\right)\left(1+x\right)^{n}$, or otherwise, obtain the following relation between binomial coefficients:

Exercise 8D Page 166

$$\left(\begin{matrix}n\\r\end{matrix}\right)+\left(\begin{matrix}n\\r-1\end{matrix}\right)=\left(\begin{matrix}n+1\\r\end{matrix}\right)$$