

- How many terms are there in the expansion of each of the following?
  - $(a + b)^9$
  - $(1 + \frac{1}{x^2})^{18}$
  - $(2x - 5y)^{33}$
  - $(p + q)^n$
- State the value for  $r$  in the expansion of  $(x^2 - \frac{4}{y})^{12}$  needed to find the required term.
  - $t_1$
  - $t_6$
  - $t_{14}$
  - 9th term
  - $t_k$
  - the middle term
- State, in unsimplified form, the general term in the expansion of each of the following.
  - $(x + y)^7$
  - $(p + q)^{13}$
  - $(1 - x)^{11}$
  - $(x - \frac{1}{x})^{12}$
- Find the indicated term in the expansion of each of the following.
  - $(x^2 + \frac{x}{2})^7$   $t_3$
  - $(a + b)^{10}$   $t_6$
  - $(\frac{x}{2} - \frac{2}{x})^{12}$  11th term
  - $(x^2 + \frac{1}{x})^9$   $t_5$
  - $(\frac{3}{4} + \frac{1}{4})^6$  4th term
  - $(2x - y)^8$  the middle term
- Find the general term, in simplified form, in the expansion of each of the following.
  - $(a + b)^{11}$
  - $(x^2 - x)^{10}$
  - $(a - \frac{1}{a})^{13}$
  - $(x^2 + \frac{1}{x})^7$
  - $(2x - \sqrt{x})^9$
  - $(\frac{5}{6} + \frac{1}{6})^5$
  - $(0.3 + 0.7)^8$
  - $(\frac{1}{2} + \frac{1}{2})^6$
- In the expansion of  $(x - \frac{1}{x})^6$ , find the following.
  - the term containing  $x^4$
  - the term containing  $x^{-2}$
- In the expansion of  $(2x + \frac{1}{x^2})^8$ , find the following.
  - the coefficient of the term containing  $x^{-4}$
  - the coefficient of the term containing  $x^{-8}$
- Find the constant term in the expansion of  $(x^3 + \frac{3}{x^3})^6$

- In the expansion of  $(a - \frac{1}{a^2})^9$ , find the following.
  - the coefficient of the term containing  $a^3$
  - the coefficient of the term containing  $a^{-6}$
  - the coefficient of the term containing  $a^{11}$
- In the expansion of  $(y^2 + \frac{1}{y})^5$ , find the following.
  - the term containing  $y$
  - the term containing  $y^{-8}$
- If  $x + \frac{1}{x} = 10$  find the value of  $x^3 + \frac{1}{x^3}$ .

## Answers

- (a) 10 (b) 19 (c) 34 (d)  $n + 1$
- (a) 0 (b) 5 (c) no such term (d) 8 (e)  $k - 1$  (f) 6
- (a)  $\binom{7}{r} x^{7-r} y^r$  (b)  $\binom{13}{r} p^{13-r} q^r$   
(c)  $\binom{11}{r} 1^{11-r} (-x)^r$  (d)  $\binom{12}{r} x^{12-r} (-\frac{1}{x})^r$
- (a)  $\frac{21}{4} x^{12}$  (b)  $252a^5b^5$  (c)  $\frac{16 \cdot 896}{x^8}$  (d)  $126x^6$   
(e)  $\frac{135}{1024}$  (f)  $1120x^4y^4$
- (a)  $\binom{11}{r} a^{11-r} b^r$  (b)  $(-1)^r \binom{10}{r} x^{20-r}$   
(c)  $(-1)^r \binom{13}{r} a^{13-2r}$  (d)  $\binom{7}{r} x^{14-3r}$   
(e)  $(-1)^r \binom{9}{r} 2^{9-r} x^{\frac{18-r}{2}}$  (f)  $\binom{5}{r} \frac{5^{5-r}}{7776}$   
(g)  $\binom{8}{r} (0.3)^{8-r} (0.7)^r$  or  $\binom{8}{r} \frac{3^{8-7r}}{10^8}$  (h)  $\binom{6}{r} \frac{1}{64}$
- (a)  $-6x^4$  (b)  $15x^{-2}$
- (a) 1120 (b) 0 (c) 540
- (a) 36 (b)  $-126$  (c) 0
- (a) 10y (b) no such term (c) 970