Sequences & Series (Q 4 & 5, Paper 1)

Lesson No. 6: Binomial Theorem

2004

4 (a) Show that $3\binom{n}{3} = n\binom{n-1}{2}$ for all natural numbers $n \geq 3$.

2005

4 (b) (i) The first three terms in the binomial expansion of $(1+kx)^n$ are $1-21x+189x^2$. Find the value of n and the value of k.

2002

5 (b) The first three terms in the binomial expansion of $(1+ax)^n$ are $1+2x+\frac{7}{4}x^4$.

(i) Find the value of a and the value of n.

(ii) Hence, find the middle term in the expansion.

2006

5 (a) Find the value of the middle term of the binomial expansion of $\left(\frac{x}{y}-\frac{y}{x}\right)^8$.

2004

5 (a) Find the fifth term in the expansion of $\left(x^2-\frac{1}{x}\right)^6$ and show that it is independent of x.

2003

5 (c) Consider the binomial expansion of $\left(ax+\frac{1}{bx}\right)^8$, where a and b are non-zero real numbers.

(i) Write down the general term.

(ii) Given that the coefficient of x^2 is the equal to the coefficient of x^4, show that $ab = 2$.

2001

5 (b) (ii) In the binomial expansion of $(1+kx)^6$, the coefficient of x^4 is 240. Find the two possible values of k.

ANSWERS

2005 4 (b) (i) $n = 7,\ k = -3$

2002 5 (b) (i) $a = \frac{1}{4},\ n = 8$ (ii) $\dfrac{35x^4}{128}$

2006 5 (a) 70

2004 5 (a) 15

2003 5 (c) (i) $\binom{8}{r}(ax)^{8-r}\left(\dfrac{1}{bx}\right)^r$

2001 5 (b) (ii) $k = \pm 2$