Name: _____ Date: _____

MATH MONKS

Sequences and Series - Binomial Theorem

1. Find p in the expansion of $\left(3x + \frac{p}{x}\right)^8$, where p>0. Given that the coefficient of x^4 in the expansion is equal to the coefficient of x^6.

2. Given: $\left(x^3 + \frac{4}{x}\right)^7$

   a. Write down the number of terms in this expansion.

   b. Find the coefficient of x^9.

3. Write the next 5 terms of the sequence defined recursively.

   a. $a_1 = 1$, $a_2 = 4$, $a_{n+2} = a_{n+1} + 3a_n$

   b. $a_1 = 50$, $a_{n+1} = \frac{a_n}{2} - 1$

4. Write the mentioned term of the given sequence.

   a. 5th term in $(y + 3x^4)^4$

   b. 2nd term in $(3x^2 - 1)^4$

   c. 3rd term in $(3y - 1)^4$

   d. 4th term in $(x^2 + 4)^4$

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MATH MONKS

Sequences and Series - Binomial Theorem

Answers

1 Find p in the expansion of $\left(3x + \frac{p}{x}\right)^8$, where p>0. Given that the coefficient of x^4 in the expansion is equal to the coefficient of x^6.

$\frac{6}{7}$

2 Given: $\left(x^3 + \frac{4}{x}\right)^7$

a Write down the number of terms in this expansion.

8 terms

b Find the coefficient of x^9.

2240

3 Write the next 5 terms of the sequence defined recursively.

a $a_1 = 1$, $a_2 = 4$, $a_{n+2} = a_{n+1} + 3a_n$

7, 19, 40, 97, 217

b $a_1 = 50$, $a_{n+1} = \frac{a_n}{2} - 1$

24, 11, 4.5, 1.25, -0.375

4 Write the mentioned term of the given sequence.

a 5th term in $(y + 3x^4)^4$

$81x^{16}$

b 2nd term in $(3x^2 - 1)^4$

$-108x^6$

c 3rd term in $(3y - 1)^4$

$54y^2$

d 4th term in $(x^2 + 4)^4$

$256x^2$