



CHEGUTU HIGH SCHOOL

LOWER 6th A1 TERM 2 2017

Wednesday 05 July 2017

Sequences & Series and Series Expansion

50 MARKS 1 HOUR ANSWER ALL QUESTIONS

PRESENT YOUR WORK NEATLY



- Given that a sequence $U_1, U_2, U_3, \dots$ is defined by $U_1 = 3$; ($n \geq 1$) where $U_{n+1} = 3 - \frac{2}{U_n}$. Find the next three terms of the sequence and describe the behaviour of this sequence as $n \rightarrow \infty$. [4]
Show that these terms are the same as those we get when using the relation $U_n = \frac{2^{n+1} - 1}{2^n - 1}$, $n \in \mathbb{Z}^+$. [3]
- The first three terms in the expansion of $(2 + ax)^n$, in ascending powers of x , are $32 - 40x + bx^2$. Find the values of the constants n, a and b . [5]
- (a) Find the independent term in the expansion of $\left(2x^2 - \frac{1}{2x}\right)^6$. [2]
(b) Find the co-efficient of the term in x^{-5} the expansion of $\left(2x + \frac{1}{x}\right)^7$. [3]
(c) Find the ratio of the term in term in x^5 and the term in x^6 , in the expansion of $(2x + 3)^{20}$. [4]
- Let $f(x) = \frac{x^2 + 7x - 6}{(x-1)(x-2)(x+1)}$
i. Express $f(x)$ in partial fractions. [4]
ii. Show that, when x is sufficiently small for x^4 and higher powers to be neglected,
$$f(x) = -3 + 2x - \frac{3}{2}x^2 + \frac{11}{4}x^3.$$
 [5]
- a) If the n^{th} term of an arithmetic progression is $4n - 7$, find the sum of the first 40 terms. [4]
b) A geometric progression has first term a and common ratio r . Given that the sum of first n terms is 422, show that $ar^{n-1} = \frac{422(r-1)+a}{r}$. [4]
If, in addition, the sum of the first and the terms are 32 and 162 respectively, find r and n . [4]
- Obtain the first four terms in the expansion of $(1 - x)^{\frac{1}{3}}$ [4]
State the range of values for which the expansion is valid. [1]
By taking the first two terms of the expansion and substituting $x = \frac{1}{1000}$, find the value of $\sqrt[3]{37}$, correct to 6 significant figures. Hint: $27 \times 37 = 999$. [3]
Joshua 1 vs. 9 - Tarakino N. P.

You are the driver of your own life. Don't let anyone steal your seat.

Tarakino N.P. (Trockers)

Page 1