

NAME _____ INDEX NUMBER _____

SCHOOL _____ DATE _____

SEQUENCE AND SERIES

| KCSE 1989 – 2012 Form 3 Mathematics | | Working Space |
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| 1. | <p>1989 Q6 P1 In a <i>jua kali</i> factory, the number of pans produced in the first month is 250. The number of pans produced per month increases on the average by 30. Find the expected number of pans produced for the first 12 months (3 marks)</p> | |
| 2. | <p>1990 Q13 P1 Find the sum of the first 30 terms of the series: $16 + 19 + 22 + \dots$ (2 marks)</p> | |
| 3. | <p>1991 Q 5 P1 A man deposits his money in a savings bank on a monthly basis. Each deposit exceeds the previous one by sh. 750. If he started by depositing sh 1500 how much will he have deposited in 12months? (3 marks)</p> | |
| 4. | <p>1992 Q14 P2 The average of the first and the fourth term of a GP is 140. Given that the first term is 64, find the common ratio (3 marks)</p> | |

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| 5. | <p>1993 Q1 P2</p> <p>A machine starts production of matchboxes at the rate of 12,000 per hour. The rate of production decreases by 40% every hour. Calculate the total number of match boxes In the first two hours</p> <p>(2 marks)</p> | |
| 6. | <p>1994 Q5 P1</p> <p>Onyango and Kamau were employed on the same day and their salaries were as follows:</p> <p>Onyango : sh 11,000 per month and an increment of sh 300 at the end of every year. Kamau : sh 10,000 per month and an increment of sh 500 at the end of every year.</p> <p>After how many years will they earn equal salaries</p> <p>(3 marks)</p> | |
| 7. | <p>1995 Q10 P1</p> <p>The first, the third and the seventh terms of an increasing arithmetic Progression are three consecutive terms of a geometric progression. In the first term of the arithmetic progression is 10 find the common difference of the arithmetic progression. (4 marks)</p> | |
| 8. | <p>1996 Q6 P1</p> <p>An employee started on a salary of K£ 6000 per annum and received constant annual increment. If he earned he earned a total of K£ 32,400 by the end of five years, calculate his annual increment.</p> | |

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| | (3marks) | Working Space |
| 9. | <p>1996 Q 10 P2</p> <p>The second and fifth terms of a geometric progression are 16 and 2 respectively. Determine the common ratio and the first term</p> <p style="text-align: right;">(3 marks)</p> | |
| 10 | <p>1996 Q21 P2</p> <p>Kubai saved sh, 2000 during the first year of employment. In each subsequent year, he saved 15% more than the preceding year until he retired.</p> <p>a)How much did he save in the second year? (1mark)</p> <p>b) How much did he save in the third year? (1mark)</p> <p>c) Find the common ratio between the savings in two consecutive years (1mark)</p> <p>d)How many years did he take to save a sum of sh 58,000? (3 marks)</p> <p>e)How much had he saved after 20years of service (2 marks)</p> | |
| 11 | <p>1997 Q4 P1</p> <p>In geometric progression, the first is a and the common ratio is r. The sum of the first two terms is 12 and the third term is 16.</p> <p>(a) Determine the ratio $\frac{ar^2}{a + ar}$</p> <p>(b) If the first term is larger than the second term, find the value of r</p> | |

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| 12 | <p>1997 Q 24 P2</p> <p>An arithmetic progression has the first term a and the common difference d.</p> <p>a) Write down the third, ninth and the twenty fifth terms of the progression. (1 mark)</p> <p>b) The arithmetic progression above is such that it is increasing and that the third, ninth and twenty fifth term from the first three consecutive terms of a geometric progression. The sum of the seventh and twice the sixth terms of the arithmetic progression is 78. Calculate</p> <p>(i) the first term and the common difference of the arithmetic Progression (5 marks)</p> <p>(ii) the sum of the first nine terms of the arithmetic progression (2marks)</p> | |
| 13 | <p>1998 Q10 P1</p> <p>The third and fifth term of an arithmetic progression are 10 and -10 respectively</p> <p>a) Determine the first and the common difference</p> <p>b) The sum of the first 15 terms</p> | |
| 14 | <p>1999 Q20 P2</p> <p>The first term of an arithmetic progression is 4 and the last term is 20. The sum of the term is 252. Calculate the number of terms and the common differences of the arithmetic progression</p> <p>(b) An Experimental culture has an initial population of 50 bacteria. The population increased by 80% every 20 minutes. Determine the time it will</p> | |

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| | take to have a population of 1.2 million bacteria. | Working Space |
| 15 | <p>2001 Q19 P2</p> <p>The nth term of a sequence is given by $2n+3$</p> <p>a) Write the first four items of the sequence. b) Find S_{50}, the sum of the first terms of the sequence. c) Show that the sum of the first terms of the sequence is given by. $S_n = n^2 + 4n$ Hence or otherwise find the first largest integral value of n such that. $S_n < 725$</p> | |
| 16 | <p>2002 Q14</p> <p>Each month, for 40 months, Amina deposited some money in a saving scheme. In the first month she deposited sh 500. Thereafter she increased her deposits by sh.50 every month. Calculate the:</p> <p>a) Last amount deposited by Amina b) Total amount Amina had saved in the 40 months.</p> | |
| 17 | <p>2003 Q15 P2</p> <p>A colony of insects was found to have 250 insects at the beginning. Thereafter the number of insects doubled every 2 days. Find how many insects there were after 16 days.</p> <p>(3 marks)</p> | |
| 18 | 2004 Q3 P2 | |

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| | Find the number of terms of the series $2 + 6 + 10 + 14 + 18 + \dots$ that will give a sum of 800. | Working Space |
| 19 | <p>2005 Q5 P2</p> <p>The first three consecutive terms of a geometrical progression are 3, x and $5\frac{1}{3}$. Find the value of x. (2 marks)</p> | |
| 20 | <p>2005 Q19 P2</p> <p>Abdi and Amoit were employed at the beginning of the same year. Their annual salaries in shillings progressed as follows:</p> <p style="padding-left: 40px;">Abdi: 60,000, 64 800, 69, 600 Amoit 60,000, 64 800, 69 984</p> <p>(a) Calculate Abdi's annual salary increment and hence write down an expression for his annual salary in his n^{th} year of employment (2 marks)</p> <p>(b) Calculate Amoit's annual percentage rate of salary increment and hence write down an expression for her salary in her n^{th} year of employment. (2 marks)</p> <p>(c) Calculate the differences in the annual salaries for Abdi and Amoit in their 7th year of employment (4 marks)</p> | |
| 21 | <p>2006 Q22 P2</p> <p>The product of the first three terms of geometric progression is 64. If the first term is a, and the common ration is r: (a) Express r in terms of a (3 marks)</p> <p style="padding-left: 40px;">(b) Given that the sum of the three terms is 14 (i) Find the value of a and r and hence write down two possible sequence each up to the 4th term. (ii) Find the product of the 50th terms of two sequences (2 marks)</p> | |

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| 22 | <p>2007 Q10 P2</p> <p>A carpenter wishes to make a ladder with 15 cross-pieces. The cross- pieces are to diminish uniformly in length from 67 cm at the bottom to 32 cm at the top. Calculate the length in cm, of the seventh cross- piece from the bottom (3 marks)</p> | |
| 23 | <p>2009 Q23 P2</p> <p>(a) The first term of an Arithmetic Progression (AP) is 2. The sum of the first 8 terms of the AP is 156</p> <p>(i) Find the common difference of the AP</p> <p>(ii) Given that the sum of the first n terms of the AP is 416, find n</p> <p>b) The 3rd, 5th and 8th terms of another AP form the first three terms of a Geometric Progression (GP). If the common difference of the AP is 3, find;</p> <p>(i) The first term of the GP;</p> <p>(ii) The sum of the first 9 terms of the GP, to 4 significant figures (2 marks)</p> | |

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| 24 | <p>2010 Q22 P2</p> <p>The first term of an Arithmetic Progression (A.P.) with six terms is p and its common difference is c. Another A.P. with five terms has also its first term as p and a common difference of d. The last terms of the two Arithmetic Progressions are equal.</p> <p>a) Express d in terms of c. (3 marks)</p> <p>b) Given that the 4th term of the second A.P. exceeds the 4th term of the first one by $1\frac{1}{2}$, find the value of c and d. (3 marks)</p> <p>c) Calculate the value of p if the sum of the terms of the first A.P. is 10 more than the terms of the second A.P. (4 marks)</p> | |
| 25 | <p>2011 Q18 P2</p> <p>The first, fifth and seventh terms of an arithmetic progression (AP) correspond to the first three consecutive terms of a decreasing Geometric Progression (GP). The first term of each progression is 64, and the common difference of the AP is d and the common ratio of the G.P is r.</p> <p>a) (i) Write two equations involving d and r (2 marks) (ii) Find the values of d and r</p> <p>b) Find the sum of the first 10 term of; (i) the A.P (ii) the G.P</p> | |

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