ARITHMETIC PROGRESSIONS

ASSIGNMENT NO. 1

1. If 5 times the 5^{th} term of an A.P. is equal to 8 times the 8^{th} term, show that its 13^{th} term is zero.
2. If the m^{th} term of an A.P. be $\frac{1}{n}$ and the n^{th} term be $\frac{1}{n}$, then show that its $(mn)^{th}$ term is 1.
3. If the p^{th} term of an A.P. is q and the q^{th} term is p, prove that its n^{th} term is $(p + q - n)$.
4. If m times the m^{th} term of an A.P. is equal to the n times its n^{th} term, show that the $(m + n)^{th}$ term of the A.P. is zero.
5. If p^{th}, q^{th} and r^{th} term of an A.P. are a, b, c respectively, then show that:

a. $a(q - r) + b(r - p) + c(p - q) = 0$

b. $(a - b)\, r + (b - c)\, p + (c - a)\, q = 0$

6. If $(m + 1)^{th}$ term of an A.P. is twice the $(n + 1)^{th}$ term, prove that $(3m + 1)^{th}$ term is twice the $(m + n + 1)^{th}$ term.
7. The sum of three numbers in A.P. is (– 3), and their product is 8. Find the numbers.
8. Find four numbers in A.P. whose sum is 20 and the sum of whose squares is 120.
9. Divide 32 into four parts which are in A.P. such that the product of extremes is to the product of means is 7 : 15.
10. If $2x,\ x + 10, 3x + 2$ are in A.P., find the value of x.