

BARNAGAR COLLEGE, SORBHOG
DEPARTMENT OF MATHEMATICS
SUMMER VACATION ASSIGNMENT

- Instructions:
1. Try all the questions during your summer vacation.
 2. All doubts will be cleared as soon as the college reopens.
 3. If you need any immediate HINT, you may contact me.
 4. Note down the solutions in your assignment copy for future reference.

1.	Insert 6 numbers between 3 and 24 such that the resulting sequence is an A.P.
2.	Show that the sum of $(m + n)^{\text{th}}$ and $(m - n)^{\text{th}}$ terms of an A.P. is equal to twice the m^{th} term.
3.	If the sum of three numbers in A.P., is 24 and their product is 440, find the numbers.
4.	Let the sum of $n, 2n, 3n$ terms of an A.P. be S_1, S_2 and S_3 , respectively, show that $S_3 = 3(S_2 - S_1)$.
5.	Find the sum of all numbers between 200 and 400 which are divisible by 7.
6.	Find the sum of integers from 1 to 100 that are divisible by 2 or 5.
7.	Find the sum of all two digit numbers which when divided by 4, yields 1 as remainder.
8.	If f is a function satisfying $f(x + y) = f(x)f(y)$ for all $x, y \in N$ such that $f(1) = 3$ and $\sum_{x=1}^n f(x) = 120$, find the value of n .
9.	The sum of the first four terms of an A.P. is 56. The sum of the last four terms is 112. If its first term is 11, then find the number of terms.
10.	The $p^{\text{th}}, q^{\text{th}}$ and r^{th} terms of an A.P. are a, b, c , respectively. Show that $(q - r)a + (r - p)b + (p - q)c = 0$.
11.	If $a\left(\frac{1}{b} + \frac{1}{c}\right), b\left(\frac{1}{c} + \frac{1}{a}\right), c\left(\frac{1}{a} + \frac{1}{b}\right)$ are in A.P., prove that a, b, c are in A.P.
12.	A farmer buys a used tractor for Rs 12000. He pays Rs 6000 cash and agrees to pay the balance in annual instalments of Rs 500 plus 12% interest on the unpaid amount. How much will the tractor cost him?
13.	A person writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with instruction that they move the chain similarly. Assuming that the chain is not broken and that it costs 50 paise to mail one letter. Find the amount spent on the postage when 8 th set of letter is mailed.
14.	A man deposited Rs 10000 in a bank at the rate of 5% simple interest annually. Find the amount in 15 th year since he deposited the amount and also calculate the total amount after 20 years.
15.	A manufacturer reckons that the value of a machine, which costs him Rs. 15625, will depreciate each year by 20%. Find the estimated value at the end of 5 years.
16.	150 workers were engaged to finish a job in a certain number of days. 4 workers dropped out on second day, 4 more workers dropped out on third day and so on. It took 8 more days to finish the work. Find the number of days in which the work was completed.

17.	The income of a person is Rs. 3,00,000, in the first year and he receives an increase of Rs. 10,000 to his income per year for the next 19 years. Find the total amount, he received in 20 years.
18.	The first term of an A.P. is a , the second term is b and the last term is c . Show that the sum of the A.P. is $\frac{(b+c-2a)(c+a)}{2(b-a)}$.
19.	The p^{th} term of an A.P. is a and q^{th} term is b . Prove that the sum of its $(p+q)$ terms is $\frac{p+q}{2} \left[a+b+\frac{a-b}{p-q} \right]$.
20.	If there are $(2n+1)$ terms in an A.P., then prove that the ratio of the sum of odd terms and the sum of even terms is $(n+1) : n$.
21.	At the end of each year the value of a certain machine has depreciated by 20% of its value at the beginning of that year. If its initial value was Rs 1250, find the value at the end of 5 years.
22.	Find the sum of first 24 terms of the A.P. a_1, a_2, a_3, \dots if it is known that $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$.
23.	The product of three numbers in A.P. is 224, and the largest number is 7 times the smallest. Find the numbers.
24.	Show that $(x^2 + xy + y^2), (z^2 + xz + x^2)$ and $(y^2 + yz + z^2)$ are consecutive terms of an A.P., if x, y and z are in A.P.
25.	If $a_1, a_2, a_3, \dots, a_n$ are in A.P. with common difference d (where $d \neq 0$); then show that the sum of the series $\sin d (\operatorname{cosec} a_1 \operatorname{cosec} a_2 + \operatorname{cosec} a_2 \operatorname{cosec} a_3 + \dots + \operatorname{cosec} a_{n-1} \operatorname{cosec} a_n)$ is equal to $\cot a_1 - \cot a_n$.

WISH YOU HAPPY SUMMER VACATION
