1. Find the value of k so that 2k + 1, 2k – 1, 3k + 4 are in A.P.
2. Find the value of k so that 2k + 1, $k^2 + k + 1$, $3k^2 - 3k + 3$ are in A.P.
3. Find four numbers in A.P. , whose sum is 10 and sum of whose squares is 30.
4. Find four numbers in A.P. , whose sum is 6 and sum of whose squares is 14.
5. Find three numbers in A.P. , whose sum is 21 and product is 315
6. Find three numbers in A.P. , whose sum is 12 and product is 28.
7. Find three numbers in A.P. , whose sum is 12 and sum of whose cubes is 288.
8. Find three numbers in A.P. , whose sum is 21 and sum of whose squares is 155.
9. Find three numbers in A.P. , whose sum is 12 and sum of whose squares is 66.
10. Divide 22 into four parts forming an A.P. such that the product of the extremes is to the product of the means is 5 :14
11. Find five numbers in A.P. whose sum is 25 and ratio of the first to the last is 2 : 3.
12. Prove that the sum of "n" arithmetic means between a and b is $\frac{n(a+b)}{2}$.
13. The angles of a quadrilateral are in A.P. whose common difference is 10°. Find the angles.
14. Which term of the sequence 8 – 6i, 7 – 4i, 6 – 2i,… is a) purely real b) purely imaginary?
15. If a, b, c are in A. P. show that $(a-c)^2 = 4(b^2 - ac)$
16. The sum of first seven terms of an A.P. is 10 and the sum of next seven terms is 17. Find the sequence.
17. How many terms are identical in the two progressions 2, 4, 6, ….upto 100 terms and 3, 6, 9, …upto 80 terms?
18. Is 310 a term of the sequence 3, 8, 13, …?
19. In an A.P., if $t_{p+1} = 2\, t_{q+1}$, prove that $t_{3p+1} = 2t_{p+q+1}$
20. For an A.P. , show that $t_p + t_{p+2q} = t_{p+q}$
21. If the p^{th} term of an A.P. is q and the q^{th} term is p, then show that its n^{th} term is p + q – n.
22. In an A.P., if m^{th} term is 1/n and n^{th} term is 1/m, then show that mn^{th} term is 1.
23. Which term of the sequence 121, 117, 113, … is the first negative term.
24. Find the 20^{th} term from the end of the sequence 3, 8, 13, …, 253.
25. Find the number of common terms in the two sequences 3, 7, 11, …, 407 and 2, 9, 16, …, 709.
26. If in an A.P. whose first term is a, the sum of first p terms is zero, show that the sum of next q terms is $-\frac{a(p+q)}{p-1}q$
27. If in an A.P., $S_p = q$ and $S_q = p$, prove that $S_{p+q} = -(p+q)$
28. If $a_1, a_2, \ldots, a_n$ form an A.P. of non-zero terms, show that : $\frac{1}{a_1a_2} + \frac{1}{a_2a_3} + \frac{1}{a_3a_4} + \ldots + \frac{1}{a_{n-1}a_n} = \frac{n-1}{a_1a_n}$
29. If $a_1, a_2, \ldots, a_n$ are in A.P., where $a_i > 0$ for all i, show that $\frac{1}{\sqrt{a_1}+\sqrt{a_2}} + \frac{1}{\sqrt{a_2}+\sqrt{a_3}} + \ldots + \frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}} = \frac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$
30. A book has 518 pages. How many digits are used in numbering the pages of this book? Explain how you figured it out.
31. It took 1992 digits to number the pages of a book. Every page was numbered, starting with page 1. How many pages does the book have?
32. Explain how to find out how many digits are needed to number the pages of a book that has n pages, if n is: a. more than 9, but less than 100 b. more than 99, but less than 1000
33. The ratio of the sums of n terms of two A.P is (7n + 1) : (4n + 27). Find the ratio of their 11^{th} terms.
34. The ratio of the sums of n terms of two A.P is (3n + 4): (5n + 6). Find the ratio of their 5^{th} terms.
35. There are n A.M. between 1 and 23 such that the ratio of last mean to the first mean is 7:1. Find the value of n.
36. AM.s have been inserted between 1 and 31 so that the ratio of 7th and (n-1)th means is 5:9. Find the value of n.