Arithmetic Progressions

Worksheet

Problem – 1.

Write the common difference of the *AP* 0.3, –0.3, –0.9, ...

Sol.

Problem – 2.

In an *AP*, if common difference $d = 6$, then find the value of $a_5 - a_{11}$.

Sol.

Problem – 3.

How many terms are there in the arithmetic series $1 + 5 + 9 + \ldots + 149$?

Sol.

Problem – 4.

What is the next term of the $2, 2^2, 2^3, 2^4, \ldots$

Sol.

Problem – 5.

Is the sequence $2, 2^2, 2^3 / 2^4, \ldots$ form an AP?

Sol.

Problem – 6.

The first term of an *AP* is 4 and its common difference is –2. Find its 16th term.

Sol.

Problem – 7.

If the numbers $d = -3, n = 7, a_n = 4$ and $5x + 2$ are in AP, find the value of x.

Sol.

Problem – 8.

In an AP, if $d = -3, n = 7, a_n = 4$ then find a.

Sol.

Problem – 9.

Check whether –150 is a term of the AP: 11, 8, 5, 2, ...

Sol.

Problem – 10.

The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

Sol.

Problem – 11.

Find the 20th term from the last term of the AP: 3, 8, 13, ..., 253.

Sol.

Problem – 12.

How many terms are there in the AP: 7, 10, 13, ..., 139.

Sol.

Problem – 13.

In an AP, find n, if $a = 1, a_n = 20$ and $s_n = 399$.

Sol.

Problem – 14.

Find a, b and c such that the numbers a, 7, b, 23, c are in AP.

Sol.

Problem – 15.

The nth term of an AP is $5n+2$. Find the common difference.

Sol.

Problem – 16.

The sum of the first n terms of an AP is $4n^2 + 2n$. Find the nth term of this AP.

Sol.

Problem – 17.

If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in AP, then prove that $2b^2 = a^2 + c^2$.

Sol.

Problem – 18.

Which term of the AP: 5, 15, 25, ... will be 130 more than its 31st term?

Sol.

Problem – 19.

How many three–digit numbers are divisible by 7?

Sol.

Problem – 20.

If the 3rd and the 9th terms of an AP are 4 and respectively, which term of this AP is zero?

Sol.

Problem – 21.

The sum of three numbers in an AP is 21 and their product is 231. Find the numbers.

Sol.

Problem – 22.

Which term of the AP: 5, 9, 13, 17, ... is 81? Also, find the sum.

Sol.

Problem – 23.

In an AP, if $S_n = n(4n+1)$, then find the AP.

Sol.

Problem – 24.

How many terms of the AP: –15, –13, –11, ... are needed to make the sum –55?

Sol.

Problem – 25.

If 'm' times the mth term of an AP is equal to 'n' times of nth term and $m \neq n$, show that its $(m+n)th$ term is zero.

Sol.

Problem – 26.

If the pth term of an AP be $\frac{1}{q}$ and qth term be $\frac{1}{p}$, then show that its $(pq)th$ term is 1.

Sol.

Problem – 27.

Divide 20 into four parts which are in AP such that the product of the first and fourth and the product of the second and third is in the ratio 2 : 3.

Sol.

Problem – 28.

Find the sums given below:

(i) $25 + 28 + 31 + \ldots + 100$
(ii) $(-5) + (-8) + (-11) + \ldots + (-230)$

Sol.

Problem – 29.

In an AP, the sum of first n terms is $\frac{3n^2}{2}+\frac{5n}{2}$. Find its 25th term.

Sol.

Problem – 30.

Sum of the first p, q and r terms of an AP are A, B and C respectively. Prove that: $\frac{A}{p}(q-r)+\frac{B}{q}(r-p)+\frac{C}{r}(p-q)=0$.

Sol.

Problem – 31.

The sum of n, $2n$, $3n$, terms of an AP are S_1, S_2, S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$.

Sol.

Problem – 32.

A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: ₹ 200 for the first day, ₹ 250 for the second day, ₹ 300 for the third day, etc., the penalty for each succeeding day being ₹ 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?

Sol.