Arithmetic Progressions Ex 9.4 Q1

Answer :

In the given problem, the sum of three terms of an A.P is 21 and the product of the first and the third term exceeds the second term by 6.

We need to find the three terms.

Here,

Let the three terms be $(a-d), a, (a+d)$ where, *a* is the first term and *d* is the common difference of the A.P

So,

$$(a-d)+a+(a+d)=21$$
$$3a=21$$

$a=7$ ...... (1)

Also,

$(a-d)(a+d)=a+6$

$a^2-d^2=a+6$ (Using $a^2-b^2=(a+b)(a-b)$)

$(7)^2-d^2=7+6$ (Using 1)

$49-13=d^2$

Further solving for *d*,

$d^2=36$

$d=\sqrt{36}$

Now, using the values of *a* and *d* in the expressions of the three terms, we get,

First term = $a-d$

So,

$$a-d=7-6$$
$$=1$$

Second term = *a*

So,

$a=7$

Also,

Third term = $a+d$

So,

$$a+d=7+6$$
$$=13$$

Therefore, the three terms are $\boxed{1, 7 \text{ and } 13}$.

Arithmetic Progressions Ex 9.4 Q2

Answer :

In the given problem, the sum of three terms of an A.P is 27 and the product of the three terms is 648. We need to find the three terms.

Here,

Let the three terms be $(a-d), a, (a+d)$ where *a* is the first term and *d* is the common difference of the A.P

So,

$$(a-d)+a+(a+d)=27$$
$$3a=27$$

$a=9$ ...... (1)

Also,

$$(a-d)a(a+d)=a+6$$
$$a\left(a^2-d^2\right)=648 \qquad \left[\text{Using } a^2-b^2=(a+b)(a-b)\right]$$
$$9\left(9^2-d^2\right)=648$$
$$81-d^2=72$$

Further solving for *d*,

$81-d^2=72$

$81-72=d^2$

$d=\sqrt{9}$

$d=3$ ...... (2)

Now, substituting (1) and (2) in three terms

First term = $a-d$

So,

$$a-d=9-3$$
$$=6$$

Also,

Second term = a

So,

$$a=9$$

Also,

Third term = $a+d$

So,

$$a+d=9+3$$
$$=12$$

Therefore, the three terms are $\boxed{6,9 \text{ and } 12}$.

Arithmetic Progressions Ex 9.4 Q3

Answer :

Here, we are given that four number are in A.P., such that there sum is 50 and the greatest number is 4 times the smallest.

So, let us take the four terms as $a-d, a, a+d, a+2d$.

Now, we are given that sum of these numbers is 50, so we get,

$$(a-d)+(a)+(a+d)+(a+2d)=50$$
$$a-d+a+a+d+a+2d=50$$
$$4a+2d=50$$

$2a+d=25$ ...... (1)

Also, the greatest number is 4 times the smallest, so we get,

$$a+2d=4(a-d)$$
$$a+2d=4a-4d$$
$$4d+2d=4a-a$$
$$6d=3a$$

$d=\frac{3}{6}a$ ...... (2)

Now, using (2) in (1), we get,

$$2a+\frac{3}{6}a=25$$
$$\frac{12a+3a}{6}=25$$

$$15a = 150$$

$$a = \frac{150}{15}$$

$$a = 10$$

Now, using the value of *a* in (2), we get

$$d = \frac{3}{6}(10)$$

$$d = \frac{10}{2}$$

$$d = 5$$

So, first term is given by,

$$a - d = 10 - 5$$
$$= 5$$

Second term is given by,

$$a = 10$$

Third term is given by,

$$a + d = 10 + 5$$
$$= 15$$

Fourth term is given by,

$$a + 2d = 10 + (2)(5)$$
$$= 10 + 10$$
$$= 20$$

Therefore, the four terms are $\boxed{5, 10, 15, 20}$.

*********** END **********