Arithmetic Progressions Ex 9.3 Q29

Answer :

In this problem, we need to find out how many multiples of 4 lie between 10 and 250.
So, we know that the first multiple of 4 after 10 is 12 and the last multiple of 4 before 250 is 248. Also, all the terms which are divisible by 4 will form an A.P. with the common difference of 4.
So here,
First term (a) = 12
Last term (a_n) = 248
Common difference (d) = 4
So, let us take the number of terms as n
Now, as we know,

$$a_n = a + (n-1)d$$

So, for the last term,

$$248 = 12 + (n-1)4$$
$$248 = 12 + 4n - 4$$
$$248 = 8 + 4n$$
$$248 - 8 = 4n$$

Further simplifying,

$$240 = 4n$$
$$n = \frac{240}{4}$$
$$n = 60$$

Therefore, the number of multiples of 4 that lie between 10 and 250 is $\boxed{60}$.

Arithmetic Progressions Ex 9.3 Q30

Answer :

In this problem, we need to find out how many numbers of three digits are divisible by 7.
So, we know that the first three digit number that is divisible by 7 is 105 and the last three digit number divisible by 7 is 994. Also, all the terms which are divisible by 7 will form an A.P. with the common difference of 7.
So here,
First term (a) = 105
Last term (a_n) = 994
Common difference (d) = 7
So, let us take the number of terms as n
Now, as we know,

$$a_n = a + (n-1)d$$

So, for the last term,

$$994 = 105 + (n-1)7$$
$$994 = 105 + 7n - 7$$
$$994 = 98 + 7n$$
$$994 - 98 = 7n$$

Further simplifying,

$$896 = 7n$$
$$n = \frac{896}{7}$$
$$n = 128$$

Therefore, the number of three digit terms divisible by 7 is $\boxed{128}$.

Arithmetic Progressions Ex 9.3 Q31

Answer :

In the given problem, let us first find the 41st term of the given A.P.

A.P. is 8, 14, 20, 26 ...

Here,

First term (a) = 8

Common difference of the A.P. (d) $=14-8$ =6

Now, as we know,

$a_n = a+(n-1)d$

So, for 41st term (n = 41),

$$a_{41} = 8+(41-1)(6)$$
$$= 8+40(6)$$
$$= 8+240$$
$$= 248$$

Let us take the term which is 72 more than the 41st term as a_n. So,

$$a_n = 72+a_{41}$$
$$= 72+248$$
$$= 320$$

Also, $a_n = a+(n-1)d$

$$320 = 8+(n-1)6$$
$$320 = 8+6n-6$$
$$320 = 2+6n$$
$$320-2 = 6n$$

Further simplifying, we get,

$$318 = 6n$$
$$n = \frac{318}{6}$$
$$n = 53$$

Therefore, the $\boxed{53^{rd}\text{ term}}$ of the given A.P. is 72 more than the 41st term.

Arithmetic Progressions Ex 9.3 Q32

Answer :

In the given problem, let us first find the 36st term of the given A.P.

A.P. is 9, 12, 15, 18 ...

Here,

First term (a) = 9

Common difference of the A.P. (d) $=12-9$ =3

Now, as we know,

$a_n = a+(n-1)d$

So, for 36th term (n = 36),

$$a_{36} = 9+(36-1)(3)$$
$$= 9+35(3)$$
$$= 9+105$$
$$= 114$$

Let us take the term which is 39 more than the 36th term as a_n. So,

$$a_n = 39+a_{36}$$
$$= 39+114$$
$$= 153$$

Also, $a_n = a + (n-1)d$

$$153 = 9 + (n-1)3$$

$$153 = 9 + 3n - 3$$

$$153 = 6 + 3n$$

$$153 - 6 = 3n$$

Further simplifying, we get,

$$147 = 3n$$

$$n = \frac{147}{3}$$

$$n = 49$$

Therefore, the $\boxed{49^{th}\text{ term}}$ of the given A.P. is 39 more than the 36^{th} term

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