

# CLASS – 10

# MATHEMATICS

## Chapter – 5

## Arithmetic Progressions

Part – 7

EXERCISE 5.2 (Q.10 – 15)

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

Soln

$$a_{17} = a_{10} + 7$$

$$a + 16d - (a + 9d) = 7$$

$$7d = 7$$

$$d = \frac{7}{7}$$

$$d = 1$$

Hence the common diff

of the given AP is 7.



11. Which term of the AP : 3, 15, 27, 39, ... will be 132 more than its 54<sup>th</sup> term?

Solu.

3, 15, 27, 39, ... ( )  $a_n$   $a_{54}$

$$a_n + 132 = a_{54}$$
$$a_n = a_{54} - 132$$
$$a + (n-1)d = a + 53d - 132$$

$d = 15 - 3$   
 $d = 12$

$$a + (n-1)d = a + 53d - 132$$

$$(n-1)12 = 53 \times 12 - 132$$

$$(n-1)12 = 12 [53 - 11]$$

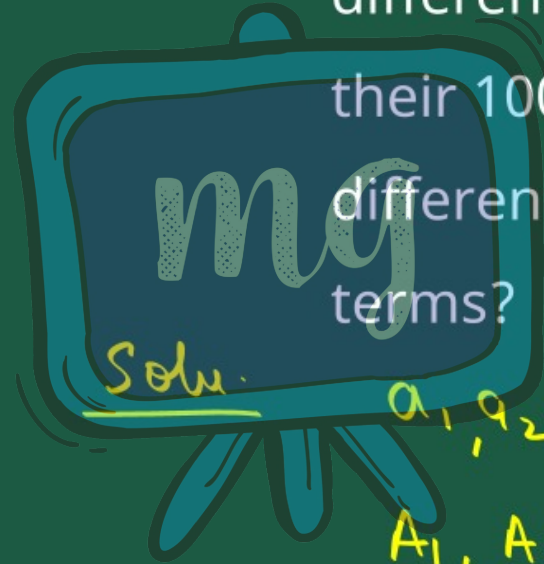
$$(n-1) = 42$$

$$n = 42 + 1$$

$$n = 43$$

Hence 43<sup>rd</sup> term  
of the given AP is  
the required term.

12. Two APs have the same common difference. The difference between their 100<sup>th</sup> terms is 100, what is the difference between their 1000<sup>th</sup> terms?



$a_1, a_2, a_3, \dots, a_{100}$   
 $A_1, A_2, A_3, \dots, A_{100}$

$$A_{100} - a_{100} = 100 \text{ --- (1)}$$

$$(A + 99d) - (a + 99d) = 100$$

$$A + \cancel{99d} - a - \cancel{99d} = 100$$

$$\boxed{A - a = 100} \text{ --- (2)}$$

$$\begin{aligned} A_{1000} - a_{1000} &= (A + 999d) - (a + 999d) \\ &= A + \cancel{999d} - a - \cancel{999d} \end{aligned}$$

$$= A - a$$

$$\boxed{A_{1000} - a_{1000} = 100}$$

13. How many three-digit numbers are divisible by 7?

Soln. 100 \_\_\_\_\_ 999

~~999~~ 105 - - - - 994

7

Therefore the required AP is

105, 112, 119 - - - (n) 994

$a = 105$  |  $a_n = 994$

$d = 7$

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

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

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

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

7

$$142 - 15 = (n-1)$$

$$127 = (n-1)$$

$$n = 127 + 1$$

$$n = 128$$

Hence there are 128, 3-digit  
No. that are divisible by 7.



14. How many multiples of 4 lie  
between 10 and 250?

Solu.

11  
12, 16, 20

$$\begin{cases} a = 12 \\ d = 4 \\ a_n = 248 \end{cases}$$

$$\underline{249}$$

$$\underline{\quad\quad\quad}, 248$$

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

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

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

$$236 = (n-1)4$$

$$236 = (n-1)4$$

$$\begin{array}{l} 236 = (n-1)4 \\ \hline 59 = (n-1) \\ 59 + 1 = n \\ \boxed{60 = n} \end{array}$$

Hence there are 60  
No. between 10 and  
250, multiple of 4.

15. For what value of  $n$ , are the  $n^{\text{th}}$  terms of two APs:  $63, 65, 67, \dots$  and  $3, 10, 17, \dots$  equal?

Solve

$63, 65, 67, \dots, a_n$

$3, 10, 17, \dots, A_n$

For the first AP.

$a = 63$

$d = 65 - 63 = 2$

$a_n = ?$

For second AP.

$A = 3$

$D = 10 - 3 = 7$

$A_n = ?$

$$a_n = A_n$$

$$a + (n-1)d = A + (n-1)D$$

$$63 + (n-1)2 = 3 + (n-1)7$$

$$63 - 3 = (n-1)7 - (n-1)2$$

$$60 = (n-1)(7-2)$$

$$60 = (n-1)5$$

$$\frac{60}{5} = (n-1)$$

$$12 = (n-1)$$

$$12 = (n-1)$$

$$12 + 1 = n$$

$$13 = n$$

Hence  $13^{\text{th}}$  term of both the A.P.'s are same.