Arithmetic Progression Questions

MCQ Question 1

How many three digit numbers are divisible by 6?

1. 196

2. 149

3. 150

4. 151

Answer (Detailed Solution Below)

Option 3 : 150

Arithmetic Progression MCQ Question 1 Detailed Solution

Formula used:

$n^{th} = a + (n - 1)d$

Here, $a \rightarrow$ first term, $n \rightarrow$ Total number, $d \rightarrow$ common difference, $n^{th} \rightarrow n^{th}$ term

Calculation:

First three-digit number divisible by 6, $(a) = 102$

Last three-digit number divisible by 6, $(n^{th}) = 996$

Common difference, $(d) = 6$

Now, $n^{th} = a + (n - 1)d$

$\Rightarrow 996 = 102 + (n - 1) \times 6$

$\Rightarrow 996 - 102 = (n - 1) \times 6$

$\Rightarrow 894 = (n - 1) \times 6$

$\Rightarrow 149 = (n - 1)$

$\Rightarrow n = 150$

∴ The total three digit number divisible by 6 is 150

MCQ Question 2

What will be the sum of 3 + 7 + 11 + 15 + 19 + ... upto 80 terms ?

1. 12880

2. 12400

3. 25760

4. 24800

Answer (Detailed Solution Below)

Option 1 : 12880

Arithmetic Progression MCQ Question 2 Detailed Solution

Given:

An AP is given
3 + 7 + 11 + 15 + 19 + ... upto 80 terms

Formula used:

Sum of nth term of an AP

$S_n = (n/2)\{2a + (n - 1)d\}$

where,

'n' is Number of terms, 'a' is First term, 'd' is Common difference

Calculations:

According to the question, we have

$S_n = (n/2)\{2a + (n - 1)d\}$ ----(1)

where, $a = 3$, $n = 80$, $d = 7 - 3 = 4$

Put these values in (1), we get

$\Rightarrow S_{80} = (80/2)\{2 \times 3 + (80 - 1) \times 4\}$

$\Rightarrow S_{80} = 40(6 + 79 \times 4)$

$\Rightarrow S_{80} = 40 \times 322$

$\Rightarrow S_{80} = 12,880$

$\therefore$ The sum of 80th terms of an AP is 12,880.

Alternate Method

n^{th} term $= a + (n - 1)d$

Here $n = 80$, $a = 3$ and $d = 4$

$\Rightarrow$ 80th term $= 3 + (80 - 1)4$

$\Rightarrow$ 80th term $= 3 + 316$

$\Rightarrow$ 80th term $= 319$

Now, the sum of nth terms of an AP

$\Rightarrow S_n = (n/2) \times (1st\ term + Last\ term)$

$\Rightarrow S_{80} = (80/2) \times (3 + 319)$

$\Rightarrow S_{80} = 40 \times 322$

$\Rightarrow S_{80} = 12,880$
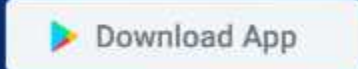
$\therefore$ The sum of 80th terms of an AP is 12,880.

MCQ Question 3

What will be the 10th term of the arithmetic progression 2, 7, 12, _____ ?

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1. 245

2. 243

3. 297

4. 47

Answer (Detailed Solution Below)

Option 4 : 47

Arithmetic Progression MCQ Question 3 Detailed Solution

Given

2, 7, 12, _____

Concept used

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

Where a = first term, n = number of terms and d = difference

Calculation

in the given series

a = 2

d = 7 - 2 = 5

$T_{10} = 2 + (10 - 1) 5$

$T_{10} = 2 + 45$

$T_{10} = 47$

Tenth term = 47

MCQ Question 4

If a, b, c are in arithmetic progression then:

1. $2a = b + c$

2. $2c = a + b$

3. $3b = 2a + 3c$

4. $2b = a + c$

Answer (Detailed Solution Below)

Option 4 : $2b = a + c$

Arithmetic Progression MCQ Question 4 Detailed Solution

Concept used:

Let a, b, c… and so on be our series

As we know the common difference $= b - a, c - b$.

The common difference is the same in arithmetic progression

$b - a = c - b$

Calculation:

$b - a = c - b$

$\Rightarrow b + b = c + a$

$\Rightarrow 2b = c + a$

$\Rightarrow 2b = a + c$

∴ a, b, c are in arithmetic progression then 2b = a + c.

Alternate Method

Let number be 1, 2, 3 which are in AP

Only one option satisfied the equation

2(2) 1 + 3 =so 2b = a + c is correct option

MCQ Question 5

For which value of k; the series 2, 3 + k and 6 are in A.P.?

1. 4

2. 3

3. 1

4. 2

Answer (Detailed Solution Below)

Option 3 : 1

Arithmetic Progression MCQ Question 5 Detailed Solution

Given:

For a value of k; 2, 3 + k and 6 are to be in A.P

Concept:

According to Arithmetic progression, $a_2 - a_1 = a_3 - a_2$

where a_1, a_2, a_3 are 1st, 2nd and 3rd term of any A.P.

Calculation:

$a_1 = 2$, $a_2 = k + 3$, $a_3 = 6$ are three consecutive terms of an A.P.

According to Arithmetic progression, $a_2 - a_1 = a_3 - a_2$

$(k + 3) - 2 = 6 - (k + 3)$

$\Rightarrow k + 3 - 8 + k + 3 = 0$

$\Rightarrow 2k = 2$

After solving, we get k = 1

MCQ Question 6

The 11th term of an AP is 90 less than the first term. If the second term is 99, find the third term.

1. 108

2. 99

3. 90

4. 81

Answer (Detailed Solution Below)

Option 3 : 90

Arithmetic Progression MCQ Question 6 Detailed Solution

Given:

The 11th term of an AP is 90 less than the first term. The second term is 99.

Formula:

nth term of an AP, $T_n = a + (n - 1)d$, where 'a' is the first term, 'n' is the total number of terms and 'd' is the common difference.

Calculation:

Let the first term is 'a' and common difference is 'd'.

$T_2 = a + d = 99$ ----(1)

According to question

$T_1 - T_{11} = 90$

$\Rightarrow a - (a + 10d) = 90$

$\Rightarrow -10d = 90$

$d = -9$

From equation (1)

$a + (-9) = 99$

$\Rightarrow a = 108$

Third term $T_3 = a + 2d$

$\Rightarrow 108 + 2 \times -9 = 108 - 18 = 90$

∴ **Required answer is 90.**

MCQ Question 7

What will come in place of the question mark (?) in the following question?
13 + 23 + 33 + ...+ 93 = ?

1. 477

2. 565

3. 675

4. 776

Answer (Detailed Solution Below)

Option 1 : 477

Arithmetic Progression MCQ Question 7 Detailed Solution

Given:

13 + 23 + ... + 93 = ?

Formula:

$S_n = n/2 \ [a + l]$

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

n = number of term

a = first term

d = common difference

l = last term

Calculation:

a = 13

d = 23 − 13 = 10

$T_n = [a + (n − 1)d]$

$\Rightarrow 93 = 13 + (n − 1) \times 10$

$\Rightarrow (n − 1) \times 10 = 93 − 13$

$\Rightarrow (n − 1) = 80/10$

$\Rightarrow n = 8 + 1$

$\Rightarrow n = 9$

$S_9 = 9/2 \times [13 + 93]$

$= 9/2 \times 106$

$= 9 \times 53$

$= 477$

MCQ Question 8

n^{th} term of an AP is 0. If AP is 54, 51, 48..., then find the value of n.

1. 15

2. 21

3. 18

4. 19

Answer (Detailed Solution Below)

Option 4 : 19

Arithmetic Progression MCQ Question 8 Detailed Solution

Given,

n^{th} term of AP = 0

The given AP = 54, 51, 48 ...

Formula:

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

Where, a = first term and d = common difference

Calculation:

Here,

a = 54

d = 51 − 54 = - 3

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

$\Rightarrow 0 = 54 + (n - 1) \times (- 3)$

$\Rightarrow (n - 1) \times (-3) = - 54$

$\Rightarrow n - 1 = 54/3$

$\Rightarrow n - 1 = 18$

$\Rightarrow n = 19$

∴ There are 19 terms of the AP.

MCQ Question 9

The common difference of AP will be _____ with $a_{25} - a_{12} = -52$

1. -14

2. -4

3. -3

4. -5

Answer (Detailed Solution Below)

Option 2 : -4

Arithmetic Progression MCQ Question 9 Detailed Solution

Given:

$a_{25} - a_{12} = -52$

Formula used:

n^{th} term of AP $= a + (n - 1)d$

a = first term

d = common difference

n = number of terms

Calculation:

Let first term be a and common difference be d

$\Rightarrow a_{25} = a + (25 - 1)d$

$\Rightarrow a_{25} = a + 24d$

Similarly,

$\Rightarrow a_{12} = a + (12 - 1)d$

$\Rightarrow a_{12} = a + 11d$

According to the question,

$\Rightarrow (a + 24d) - (a + 11d) = -52$

$\Rightarrow 13d = -52$

$\Rightarrow d = -4$

∴ The common difference of AP will be - 4.

MCQ Question 10

The sum of 6 consecutive odd numbers is 144. What will be the product of first number and the last number?

1. 513

2. 551

3. 609

4. 567

Answer (Detailed Solution Below)

Option 2 : 551

Arithmetic Progression MCQ Question 10 Detailed Solution

GIVEN:

The sum of 6 consecutive odd numbers is 144.

CALCULATION:

Let six consecutive odd numbers be x, x + 2, x + 4, x + 6, x + 8 and x + 10.

Now,

x + x + 2 + x + 4 + x + 6 + x + 8 + x + 10 = 144

$\Rightarrow$ 6x + 30 = 144

$\Rightarrow$ 6x = 144 − 30

$\Rightarrow$ x = 114/6

$\Rightarrow$ x = 19

$\therefore$ x + 10 = 29

Hence,

Product of the first number and the last number = 19 × 29 = 551