AP and GP

Solution

1. Answer: (A)
For an AP,
$a_n = a+(n-1)d$
$= 28+(7-1)(-4)$
$= 28+6(-4)$
$= 28-24$
$a_n=4$

2. Answer: (B)
$a = 10$, $d = 10$
$a_1 = a = 10$
$a_2 = a_1+d = 10+10 = 20$
$a_3 = a_2+d = 20+10 = 30$
$a_4 = a_3+d = 30+10 = 40$

3. Answer: (C)
First term, a = 3
Common difference, d = Second term – First term
$\Rightarrow 1 – 3 = -2$
$\Rightarrow d = -2$

4. Answer: (C)
Given,
A.P. = 10, 7, 4, …
First term, a = 10
Common difference, $d = a_2 - a_1 = 7-10 = -3$
As we know, for an A.P.,
$a_n = a +(n-1)d$
Putting the values;
$a_{30} = 10+(30-1)(-3)$
$a_{30} = 10+(29)(-3)$
$a_{30} = 10-87 = -77$

5. Answer: (B)
A.P. = -3, -1/2, 2 …
First term a = – 3
Common difference, $d = a_2 - a_1 = (-1/2) -(-3)$
$\Rightarrow(-1/2) + 3 = 5/2$
Nth term;
$a_n = a+(n-1)d$
$a_{11} = 3+(11-1)(5/2)$
$a_{11} = 3+(10)(5/2)$
$a_{11} = -3+25$
$a_{11} = 22$

6. Answer: (C)
$a_2 = 13$ and
$a_4 = 3$
The nth term of an AP;
$a_n = a+(n-1) d$
$a_2 = a +(2-1)d$
$13 = a+d$ ……………… (i)
$a_4 = a+(4-1)d$
$3 = a+3d$ ………….. (ii)
Subtracting equation (i) from (ii), we get,
$– 10 = 2d$
$d = – 5$
Now put value of d in equation 1
$13 = a+(-5)$
a = 18 (first term)
$a_3 = 18+(3-1)(-5)$
= 18+2(-5) = 18-10 = 8 (third term).

7. Answer: (D)
Given, 3, 8, 13, 18, … is the AP.
First term, a = 3
Common difference, $d = a_2 - a_1 = 8 - 3 = 5$
Let the nth term of given A.P. be 78. Now as we know,
$a_n = a+(n-1)d$
Therefore,
$78 = 3+(n -1)5$
$75 = (n-1)5$
$(n-1) = 15$
$n = 16$

8. Answer: (B)
First term = -3 and second term = 4
$a = -3$
$d = 4-a = 4-(-3) = 7$
$a_{21}=a+(21-1)d$
$=-3+(20)7$
$=-3+140$
$=137$

9. Answer: (A)
Nth term in AP is:
$a_n = a+(n-1)d$
$a_{17} = a+(17-1)d$

a_{17} = a +16d
In the same way,
a10 = a+9d
Given,
a17 − a10 = 7
Therefore,
(a +16d)−(a+9d) = 7
7d = 7
d = 1
Therefore, the common difference is 1.

10. **Answer: (C)**
The multiples of 4 after 10 are:
12, 16, 20, 24, …
So here, a = 12 and d = 4
Now, 250/4 gives remainder 2. Hence, 250 – 2 = 248 is divisible by 2.
12, 16, 20, 24, …, 248
So, nth term, a_n = 248
As we know,
a_n = a+(n−1)d
248 = 12+(n-1)×4
236/4 = n-1
59 = n-1
n = 60

11. **Answer: (D)**
Given, A.P. is 3, 8, 13, …, 253
Common difference, d= 5.
In reverse order,
253, 248, 243, …, 13, 8, 5
So,
a = 253
d = 248 − 253 = −5
n = 20
By nth term formula,
a_{20} = a+(20−1)d
a_{20} = 253+(19)(−5)
a_{20} = 253−95
a_{20} = 158

12. **Answer: (A)**
The first five multiples of 3 is 3, 6, 9, 12 and 15
a=3 and d=3
n=5
Sum, S_n = n/2[2a+(n-1)d]
S_5 = 5/2[2(3)+(5-1)3]
=5/2[6+12]
=5/2[18]
=5 x 9
= 45

13. **Answer: (A)**
Given AP: 5, 8, 11, 14,….
First term = a = 5
Common difference = d = 8 – 5 = 3
nth term of an AP = a_n = a + (n – 1)d
Now, 10th term = a_{10} = a + (10 – 1)d
= 5 + 9(3)
= 5 + 27
= 32

14. **Answer: (D)**
Given,
d = -4, n = 7, an = 4
We know that,
a_n = a + (n – 1)d
4 = a + (7 – 1)(-4)
4 = a + 6(-4)
4 = a – 24
⇒ a = 4 + 24 = 28

15. **Answer: (B)**
–10, –6, –2, 2,…
Let a_1 = -10, a_2 = -6, a_3 = -3, a_4 = 2
$a_2 – a_1$ = -6 – (-10) = 4
$a_3 – a_2$ = -2 – (-6) = 4
$a_4 – a_3$ = 2 – (-2) = 4
The given list of numbers is an AP with d = 4.

16. **Answer: (B)**
Given,
a_2 = 13
a + d = 13
a = 13 – d….(i)
a_5 = 25
a + 4d = 25….(ii)
Substituting (i) in (ii),
13 – d + 4d = 25
3d = 12
d = 4
So, a = 13 – 4 = 9
a_7 = a + 6d = 9 + 6(4) = 9 + 24 = 33

17. **Answer: (B)**
Given AP:
21, 42, 63, 84,…
a = 21

$d = 42 – 21 = 21$
$a_n = 210$
$a + (n – 1)d = 210$
$21 + (n – 1)(21) = 210$
$21 + 21n – 21 = 210$
$21n = 210$
$n = 10$

18. Answer: (A)
Given,
$a_{18} – a_{14} = 32$
We know that, $a_n = a + (n – 1)d$
So,
$a + 17d – (a + 13d) = 32$
$17d – 13d = 32$
$4d = 32$
$d = 8$

19. Answer: (C)
The famous mathematician associated with finding the sum of the first 100 natural numbers is Gauss.

20. Answer: (A)
Given AP: 10, 6, 2,…
Here, $a = 10$, $d = -4$
Sum of first n terms = $S_n = (n/2)[2a + (n – 1)d]$
The sum of first 16 terms = $S_{16} = (16/2)[2(10) + (16 – 1)(-4)]$
$= 8[20 + 15(-4)]$
$= 8(20 – 60)$
$= 8(-40)$
$= -320$