UNIT 20 :

Sequences

Level 1

1 Which of the following is/are A.P.(s)?

(1) 8, 88, 888, ...

(2) 8, 8+8, 8+8+8, ...

(3) x, $x+8y$, $x+16y$, ...

A (1) only

B (3) only

C (1) and (2) only

D (2) and (3) only

E (1), (2) and (3)

2 Find the $(n+1)$th term of the A.P. 4, 7, 10, ...

A $4+3n$ B $1+3n$ C $-1+3n$ C $3+4n$ E $-1+4n$

3 How many terms are there in the A.P. $-2, 3, 8, \ldots, 23$?

A 5 B 6 C 7 D 8 E 9

4 The second and fourth terms of an A.P. are 5 and 2 respectively. Find the first term.

A $-\frac{13}{2}$ B 5 C $\frac{11}{2}$ D 6 E $\frac{13}{2}$

5 If x, $x+2$, x^2+4 are in A.P., $x =$

A -1 B 0 C 1 D -1 or 0 E 0 or 1

6 x_1, x_2, x_3 form an A.P. Which of the following is/are true?

(1) $2x_1, 2x_2, 2x_3 \ldots$ form an A.P.

(2) $2^{x_1}, 2^{x_2}, 2^{x_3} \ldots$ form an A.P.

(3) ${x_1}^2, {x_2}^2, {x_3}^2 \ldots$ form an A.P.

A (1) only

B (3) only

C (1) and (2) only

D (2) and (3) only

E (1), (2) and (3)

7 Find the $(2n-1)$th term of the G.P. 2, 6, 18, ...

A $2(3)^{n-1}$ B $2(3)^n$ C $2(9)^{n-1}$ D $\frac{2}{3}(9)^n$ E $\frac{2}{3}(9)^{n-1}$

8 $4, a, b, \frac{1}{2}$ are in G.P. $ab =$

A 2 B $\sqrt{2}$ C $\frac{1}{2}$ D -2 E 2 or -2

9 The third and fifth terms of a G.P. are 32 and 8 respectively. Find the common ratio.

A 2 B ± 2 C $\frac{1}{2}$ D $\pm\frac{1}{2}$ E $\frac{1}{4}$

[10] $\sum_{r=1}^{4}(2r-1) =$

A 12 B 14 C 16 D 20 E 22

11 Find the sum to n terms of the A.P. 3, 5, 7, ...

A $\frac{n(n+3)}{2}$

B $n(n+2)$

C $n(n+1)$

D $n(n-1)$

E $2n(n+2)$

12 $10+13+16+\ldots+40 =$

A 235 B 265 C 275 D 295 E 583

13 If $T_n = \frac{4}{2^n}$, $T_1 + T_2 + \ldots + T_k =$

A $2(2^k - 1)$

B $2(1-\frac{1}{2^k})$

C $4(\frac{1}{2^k}-1)$

D $4(2^k - 1)$

E $4(1-\frac{1}{2^k})$

14 Find the sum to infinity of the G.P. $6, -3, \frac{3}{2}, \ldots$

A 3 B 4 C $\frac{9}{2}$ D 9 E 12

[15] If m is an arithmetic mean between a and b, $a =$

A $2m-b$ B $b-2m$ C $\frac{m+b}{2}$ D $2b-m$ E $\frac{2m-b}{3}$

[16] If x is a geometric mean inserted between 4 and 2, $x =$

A $\sqrt{8}$ B $\sqrt{2}$ C $\pm\sqrt{8}$ D $\pm\sqrt{2}$ E $\pm\frac{1}{\sqrt{2}}$

Level 2

17 Let T_n be the nth term of an A.P. If $T_2 : T_3 = 2 : 3$ and $T_4 + T_5 = 18$, find T_1.

A 2 B 3 C 6 D 7 E 9

18 The sum to n terms of the A.P. 8, 6, 4, ... is 18. $n =$

A 3 B 4 C 6 D 3 or 6 E 4 or 6

19 The sum to n terms of an A.P. is $n^2 - 2n - 3$. Find its nth term.

A $-2n+3$ B $2n-3$ C $6n-3$ D $6n-1$ E $6n+3$

20 Consider the A.P. 6, 10, 14, ... Find the least number of terms needed so that the sum exceeds 100.

A 5 B 6 C 7 D 8 E 9

21 Find the sum of all integers between 10 and 100 which are divisible by 3 but <u>not</u> by 4.

A 336 B 432 C 1 233 D 1 329 E 1 665

22 $a \times a^4 \times a^7 \times \cdots \times a^{(3n-2)} =$

A a^{2n} B $a^{\frac{3n}{2}}$ C $a^{\frac{n}{2}(3n+1)}$ D $a^{\frac{n}{2}(3n-3)}$ E $a^{\frac{n}{2}(3n-1)}$

23 For $-1 < a < 1$ and $-1 < b < 1$, $(a+b)+(a^2+\frac{1}{b})+(a^3+\frac{1}{b^3})+\cdots =$

A $\frac{a}{a-1}+\frac{b}{b-1}$

B $\frac{a}{1-a}+\frac{b}{1-b}$

C $\frac{a}{a-1}+\frac{b^3}{1-b^2}$

D $\frac{a}{1-a}+\frac{b^3}{1-b^2}$

E $\frac{a}{1-a}+\frac{b^3}{b^2-1}$

24 The fifth term of a G.P. is 16 times the first term. Find the second term if the first term is 3.

A 2 B 6 C ± 2 D ± 6 E 2 or 6

25 The figure is formed by constructing circular arcs. The radius of a particular arc is half of that of the previous constructed arc. If such arcs are constructed successively, find the sum of the lengths of the infinitely many arcs constructed in this way.

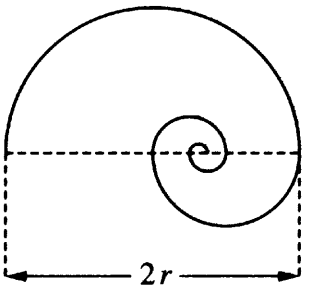
A πr

B $\frac{3}{2}\pi r$

C $2\pi r$

D $3\pi r$

E $4\pi r$



26 Express $0.1\dot{2}$ as a fraction.

A $\frac{3}{25}$ B $\frac{4}{33}$ C $\frac{10}{99}$ D $\frac{11}{90}$ E $\frac{13}{90}$

27 Given that 2, a, b form an A.P. and a, b, 9 form a G.P. Find a.

A -4 or 4 B $\frac{1}{4}$ or 4 C 4 D $\frac{1}{4}$ E -4

28 The sum of first 3 terms of a G.P. is 12.5% smaller than the sum to infinity. Find the common ratio.

A $\frac{1}{2}$

B $\frac{1}{4}$

C $\frac{1}{8}$

D $\frac{7}{8}$

E Cannot be determined.

[29] Which of the following is/are G.P.s?

(1) $\log 10$, $\log 100$, $\log 1000$

(2) $\sin 30°$, $\sin 45°$, $\sin 60°$

(3) $\tan 30°$, $\tan 45°$, $\tan 60°$

A (1) only

B (3) only

C (1) and (2) only

D (2) and (3) only

E (1), (2) and (3)

30 The sum to n terms of the G.P. 2, 4, 8, ... exceeds 2 000. Find the least value of n.

A 7 B 9 C 10 D 11 E 12

[31] When 3 arithmetic means are inserted between a and b, the middle one is 10. $a+b=$

A $\frac{10}{3}$ B 5 C 10 D 20 E 30

[32] The geometric mean of a and b is x; of b and c is y; of c and a is z. $abc=$

A xyz

B $(xyz)^2$

C $\sqrt{xyz}$

D $\sqrt{(xyz)^3}$

E $\frac{1}{3}(x+y+z)$