

Progression-Exercise Questions updated on Dec 2024

1). Find the 15th term of an arithmetic progression whose first term is 2 and the common difference is 3.

- a.45
- b.38
- c.44
- d.40

2). Find the number of terms in an arithmetic progression with the first term 2 and the last term being 62, given that common difference is 2.

- a.31
- b.40
- c.22
- d.27

3). The first term of an arithmetic progression is 3 and the 10th term is 21. Find 15th and 22nd terms.

- a.21,35
- b.31,45
- c.30,46
- d.29,40

4). The 5th term and 21st term of a series in A.P are 10 and 42 respectively. Find the 31st term.

- a.50
- b.55
- c.65
- d.62

5). Five times the fifth term of an A.P is equal to six times the sixth term of the A.P, What is the value of the eleventh term?

- a.1
- b.5
- c.0

d.2

6). Find the sum of all 2 digit numbers divisible by 3.

a.2000

b.1665

c.1300

d.1448

7). The sum of n terms of a series in A.P is $6n^2 + 6n$. What is the 4th term of the series?

a.38

b.49

c.60

d.48

8). How many terms are there in 2,4,8,16,.....1024?

a.10

b.6

c.9

d.8

9). The sum of the first five terms of a G.P is 363. If the common ratio is $\frac{1}{3}$ find the first term.

a.323

b.243

c.232

d.332

10). Find the sum of the following series, $1, \frac{4}{5}, \frac{16}{25}, \frac{64}{125}$

a.10

b.6

c.9

d.5

11). There are n arithmetic means between 3 and 45 such that the sum of these arithmetic means is 552. find the value of n .

- a.11
- b.15
- c.17
- d.23

12). Find the last term of a G.P whose first term is 9 and common ratio is $(\frac{1}{3})$ if the sum of the terms of the G.P is $(\frac{40}{3})$

- a. $\frac{1}{3}$
- b. $\frac{2}{5}$
- c. $\frac{1}{4}$
- d. $\frac{2}{3}$

13). Find the common ratio of three numbers in G.P whose product is 216 and the sum of the products taken in pairs is 114.

- a.2 or $\frac{1}{2}$
- b. $\frac{2}{3}$ or $\frac{3}{2}$
- c. $\frac{3}{4}$ or $\frac{4}{3}$
- d.4 or $\frac{1}{4}$

14). In an A.P consisting of 27 terms, the sum of the first three terms is 21 and that of the three middle terms is 93. Find the first term and the common difference.

- a.6,3
- b.6,23
- c.7,3
- d.5,2

15). Find the first term and the common ratio of a G.P whose fourth term is 250 and seventh term is 31,250

- a. $\frac{2}{5}, 25$
- b. $\frac{4}{5}, \frac{1}{2}$
- c.1,16
- d.2,5

16). The sum of the first eight terms of a geometric series is 10,001 times the sum of its first four terms. Find the common ratio of these series

- a.1,000
- b.10
- c.10
- d.100

17). What is the sum of the first 15 terms of an A.P whose 11th and 7th terms are 5.25 and 3.25 respectively

- a.56.25
- b.60
- c.52.5
- d.None of these

18). If sum of three numbers in A.P is 33 and sum of their squares is 491, then what are the three numbers.

- a.5,11,17
- b.7,11,15
- c.9,11,13
- d.3,11,19

19). Four angles of a quadrilateral are in G.P. Whose common ratio is an integer. Two of the angles are acute while the other two are obtuse. The measure of the smallest angle of the quadrilateral is

- a.12
- b.24
- c.36
- d.48

20). The sum of the terms of an infinite G.P is 7 and the sum of the cubes of the terms is 1,225. Find the first term of the series.

- a. $\frac{35}{3}$
- b. $\frac{35}{2}$
- c. $\frac{15}{2}$
- d. $\frac{9}{4}$

Answer & Explanations

1. Exp. n^{th} term of A.P = $a + (n-1) * d$
 $= 2 + (15-1) * 3, = 2 + 42 = 44.$

2. Exp. The n^{th} term = $a + (n-1) * d$
 $62 = 2 + (n-1) * 2, 62 - 2 = (n-1) * 2, n = 60/2 + 1 = 31.$

3. Exp. $a = 3, T_{10} = a + 9d = 21, 3 + 9d = 21, d = 18/9 = 2$
 $T_{15} = a + 14d = 3 + 14 * 2 = 31, T_{22} = a + 21d = 3 + 21 * 2 = 45$

4. Exp. $a + 4d = 10$ (1)
 $a + 20d = 42$ (2)
 Eqn (2) – Eqn (1) gives $16d = 32, d = 2$
 Substituting $d = 2$ in either (1) or (2), $a = 2.$
 31 st term = $a + 30d = 2 + 30 * 2 = 62$

5. Exp. $5(a + 4d) = 6(a + 5d), 5a + 20d = 6a + 30d, a + 10d = 0,$
 i.e 11 th = 0

6. Exp. All 2 digit numbers divisible by 3 are 12,15,18,21,..... 99
 This is an A.P with $a = 12,$ and $d = 3,$ Let it contain n terms
 Then, $12 + (n - 1) * 3 = 99,$ or $n = (99 - 12) / 3 + 1 = 30$
 Required sum = $30/2 * (12 + 99) = 15 * 111 = 1665$

7. Exp. 4 th term = sum of 4 terms - sum of 3 terms
 $= (6 * 4^2 + 6 * 4) - (6 * 3^2 + 6 * 3), = (96 + 24) - (54 + 18)$
 $= 120 - 72 = 48$

8. Exp. Let the number of terms be $n.$ Then,
 $2 * 2^{n-1} = 1024, 2^{n-1} = 512 = 2^9$
 $n - 1 = 9, n = 10$

9. Exp. Sum of the first n terms of a G.P = $a(1-r^n)$,

$$1 - r$$

$$a \left[1 - \left(\frac{1}{3}\right)^5 \right]$$

$$1 - \frac{1}{3} = 363$$

$$a = \frac{363 \left[1 - \frac{1}{3} \right]}{1 - \left(\frac{1}{3}\right)^5} = \frac{363 \cdot \frac{2}{3}}{1 - \frac{1}{243}} = \frac{242}{\left(\frac{242}{243}\right)}$$

$$1 - \left(\frac{1}{3}\right)^5$$

$$a = 243$$

10. Exp. It is a G.P with infinite terms. The common ratio is $\frac{4}{5}$ and this is less than 1. The sum to infinity of a series with first term 'a' and common ratio 'r' = $\left[\frac{a}{1-r} \right]$, The sum to infinity = $\frac{1}{1 - \frac{4}{5}} = 5$

11. Exp. Arithmetic mean = $\frac{552}{n} = \frac{1}{2}(3+45)$, = 24

$$n = \frac{552}{24} = 23$$

12. Exp. Sum of the G.P. = $\frac{\text{First term} - r \cdot \text{last term}}{1-r}$

$$\frac{40}{3} = \frac{9 - \frac{1}{3} (\text{last term})}{\frac{2}{3}}$$

$$\frac{2}{3}$$

$$\text{Last term} = \left(-\frac{40}{3} \cdot \frac{2}{3} + 9 \right) \cdot 3 = -\frac{80}{3} + 27 = \frac{1}{3}$$

13. Exp. Let the terms be $\frac{a}{r}, a, ar$

$$\frac{a}{r} \cdot a \cdot ar = a^3 = 216, a = 6$$

$$\left(\frac{a}{r} \cdot a\right) + (a \cdot ar) + (ar \cdot a/r) = 114, \frac{a^2}{r} + a^2 r + a^2 = 114$$

$$a^2 \left(\frac{1}{r} + r + 1 \right) = 114, 36 \left[\frac{1+r^2+r}{r} \right] = 114$$

$$6 \left[\frac{1+r^2+r}{r} \right] = 19, 6r^2 - 13r + 6 = 0,$$

On solving, $r = \frac{2}{3}$ or $\frac{3}{2}$

14. Exp. As the sum of the first three terms will be thrice the second term, $3(a+d) = 21$, also the sum of 13th, 14th and 15th = $3(a+13d) = 93$

On solving the two eqns, $d = 2$, $3(a+2) = 21$, $a = 5$

15. Exp. $a \cdot r^3 = 250$, $a \cdot r^6 = 31,250$, $r^3 = \frac{31,250}{250} = 125$

$$r = 5, a \cdot 125 = 250, a = 2$$

16. Exp. $a(r^8 - 1)/(r - 1) = 10001 a(r^4 - 1)/(r - 1)$

$$r^4 + 1 = 10001, r = 10$$

17. Exp. $a + 10d = 5.25, a + 6d = 3.25, 4d = 2, d = \frac{1}{2}$

$$a + 5 = 5.25, a = 0.25 = \frac{1}{4}, s_{15} = \frac{15}{2} (2 \cdot \frac{1}{4} + 14 \cdot \frac{1}{2})$$

$$= \frac{15}{2} (\frac{1}{2} + 14 \cdot \frac{1}{2}) = \frac{15}{2} \cdot \frac{15}{2} = \frac{225}{4} = 56.25$$

18. Exp. $a + (a + d) + (a + 2d) = 3(a + d) = 33,$

$$a + d = 11, \text{ or second term} = 11, \text{ first term} = 11 - d,$$

$$\text{Then } (11 - d)^2 + 11^2 + (11 + d)^2 = 491$$

$$2d^2 = 491 - (3 \cdot 121) = 491 - 363 = 128$$

$$d^2 = 64, d = 8, a = 3,$$

19. Let the angles be $a, ar, ar^2, ar^3.$

$$\text{Sum of the angles} = a(r^4 - 1)/(r - 1) = a(r^2 + 1)(r + 1) = 360$$

$$a < 90, \text{ and } ar < 90, \text{ Therefore, } a(1 + r) < 180, \text{ or } (r^2 + 1) > 2$$

$$\text{Therefore, } r \text{ is not equal to } 1. \text{ Trying for } r = 2 \text{ we get } a = 24$$

$$\text{Therefore, The angles are } 24, 48, 96 \text{ and } 192.$$

20. Exp. $Sa = a/(1 - r) = 7 \dots\dots\dots (1)$

$$\text{Sum to infinity of the cubes} = a^3 / (1 - r^3) = 1,225$$

$$\text{From (1) } a^3 / (1 - r)^3 = 7^3 = 343$$

$$\text{Therefore, } (1 - r)^3 / (1 - r^3) = 1225/343,$$

$$(1 + r^2 - 2r) / (1 + r^2 + r) = 25/7$$

$$7 + 7r^2 - 14r = 25 + 25r + 25r^2$$

$$18r^2 + 39r + 18 = 0, \text{ on solving } r = -3/2 \text{ or } -2/3$$

$$\text{for an infinite G.P } |r| < 1, r = -2/3$$

$$\text{Therefore, } a / [1 - (-2/3)] = 7, a = 7 \cdot 5/3 = 35/3$$