

EXERCISE 2.1

Def -> यदि कोई श्रेणी के दो लगातार पदों का अनुपात समान हो, तो उस श्रेणी को गुणोत्तर श्रेणी कहेंगे। इसके पास एक ही small 'a' तथा common ratio को 'r' से निरूपित करते हैं।

G.P (Geometric Progression)
2, 4, 8, 16, ...
a = 2, r = 4/2 = 2
tn = a * r^(n-1)

Q.1. which term of G.P 1, sqrt(3), 3, ... will be 81?
a = 1, r = sqrt(3) = sqrt(3), tn = 81

tn = a * r^(n-1)
or, 81 = 1 * (sqrt(3))^(n-1)
or, (3)^4 = (sqrt(3))^(n-1)
or, (sqrt(3))^8 = (sqrt(3))^(n-1)
or, n-1 = 8
or, n = 8+1 = 9th term Ans.

Q.2. write down the 9th term of the G.P sqrt(3), 1/sqrt(3), 1/(3*sqrt(3)), ... ?

a = sqrt(3), r = 1/sqrt(3) = 1/3, n = 9
tn = a * r^(n-1)
= sqrt(3) * (1/3)^(9-1) = sqrt(3) * 1/3^8 = sqrt(3)/(3^8) Ans.

Q.3. How many terms are there in G.P 5, 20, 80, ..., 5120

$$a = 5, \quad r = \frac{20}{5} = 4, \quad t_n = 5120$$

$$t_n = a \cdot r^{n-1}$$

$$\text{or, } 5120 = 5 \cdot (4)^{n-1}$$

$$\text{or, } \frac{5120}{5} = (4)^{n-1}$$

$$\text{or, } 1024 = (4)^{n-1}$$

$$\text{or, } (4)^5 = (4)^{n-1}$$

$$\text{or, } n-1 = 5$$

$$\text{or, } n = 5 + 1$$

$$\therefore n = 6 \text{ Ans.}$$

Q.4. Which term of G.P 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, ... will be $\frac{1}{512}$.

$$a = 1, \quad r = \frac{1}{2}, \quad t_n = \frac{1}{512}$$

$$t_n = a \cdot r^{n-1}$$

$$\text{or, } \frac{1}{512} = 1 \cdot \left(\frac{1}{2}\right)^{n-1}$$

$$\text{or, } \frac{1}{512} = \left(\frac{1}{2}\right)^{n-1}$$

$$\text{or, } \left(\frac{1}{2}\right)^9 = \left(\frac{1}{2}\right)^{n-1}$$

$$\text{or, } n = 9 + 1 = 10 \text{ Ans.}$$

Q.5. Find the seventh term of the G.P. $2^2, 2^3, 2^4, \dots$
 $4, 8, 16, \dots$

$$a = 4, r = \frac{8}{4} = 2, n = 7$$

$$\begin{aligned} t_n &= a \cdot r^{n-1} \\ &= 4 \cdot 2^{7-1} \\ &= 4 \cdot (2)^6 \\ &= 4 \cdot 64 \\ &= 256 \text{ Ans.} \end{aligned}$$

Q.6. If the fifth term of the G.P. is 81 and second term is 24, Find the G.P.

$$T_5 = 81 \quad \text{Let, } a = 1, (r = 2)$$

$$T_2 = 24$$

$$T_5 = 81$$

$$a \cdot r^{5-1} = 81$$

$$a \cdot r^4 = 81 \quad \dots \text{ (i)}$$

$$T_2 = 24$$

$$a \cdot r^{2-1} = 24$$

$$a \cdot r = 24 \quad \dots \text{ (ii)}$$

Divide (i) by (ii)

$$\frac{a \cdot r^4 = 81}{a \cdot r = 24} =$$

$$\text{or, } (2)^3 = \frac{27}{8}, \text{ or, } (2)^3 = \left(\frac{3}{2}\right)^3, a, r = \frac{3}{2}$$

Putting the value of d in (i)

$$a \cdot r^4 = 81$$

$$\therefore a \cdot \left(\frac{3}{2}\right)^4 = 81$$

$$\therefore a = \frac{81 \times 16}{81}$$

$$a = 16$$

∴ P

$$a, ar, ar^2$$

$$16, 16 \times \frac{3}{2}, 16 \times \frac{9}{4}$$

$$16, 24, 36, \dots \text{Ans}$$

Q.8. If 5th and 8th term of a G.P. be 48 and 384 respectively. Find the G.P.

$$\text{Let, } a = a, r = r$$

$$T_5 = 48$$

$$a \times r^4 = 48 \quad \dots \text{(i)}$$

$$T_8 = 384$$

$$a \times r^7 = 384 \quad \dots \text{(ii)}$$