1. Find, which of the following sequences form a G.P. :

(i) 8, 24, 72, 216, ...

(ii) $\dfrac{1}{8}, \dfrac{1}{24}, \dfrac{1}{72}, \dfrac{1}{216}, \ldots\ldots\ldots$

(iii) 9, 12, 16, 24, ...

2. Find the 9th term of the series :
1, 4, 16, 64, ...

3. Find the seventh term of the G.P. :

1, $\sqrt{3}$, 3, $3\sqrt{3}$, ...

4. Find the 8th term of the sequence :

$\dfrac{3}{4}, 1\dfrac{1}{2}, 3, \ldots\ldots\ldots$.

5. Find the 10th term of the G.P. :

12, 4, $1\dfrac{1}{3}, \ldots\ldots\ldots$.

6. Find the nth term of the series :
1, 2, 4, 8, ...

7. Find the next three terms of the sequence :

$\sqrt{5}$, 5, $5\sqrt{5}$, ...

8. Find the sixth term of the series :

$2^2, 2^3, 2^4, \ldots\ldots\ldots$.

9. Find the seventh term of the G.P. :

$\sqrt{3} + 1, 1, \dfrac{\sqrt{3}-1}{2}, \ldots\ldots\ldots$.

10. Find the G.P. whose first term is 64 and next term is 32.

11. Find the next three terms of the series :

$\dfrac{2}{27}, \dfrac{2}{9}, \dfrac{2}{3}, \ldots\ldots\ldots$.

12. Find the next two terms of the series :

2 – 6 + 18 – 54 ....

1. Find the seventh term from the end of the series : $\sqrt{2}$, 2, $2\sqrt{2}$, ..., 32.

2. Find the third term from the end of the G.P.
$$\frac{2}{27}, \frac{2}{9}, \frac{2}{3}, ..., 162.$$

3. For the G.P. $\frac{1}{27}, \frac{1}{9}, \frac{1}{3}, ..., 81;$

   find the product of fourth term from the beginning and the fourth term from the end.

4. If for a G.P., p^{th}, q^{th} and r^{th} terms are a, b and c respectively; prove that :

$(q - r) \log a + (r - p) \log b + (p - q) \log c = 0$

Proceed as example 11 to show :
$a^{q-r} \cdot b^{r-p} \cdot c^{p-q} = 1$
Now take log of both the sides.

5. If a, b and c are in G.P., prove that : $\log a$, $\log b$ and $\log c$ are in A.P.

6. If each term of a G.P. is raised to the power x, show that the resulting sequence is also a G.P.

7. If a, b and c are in A.P, a, x, b are in G.P. whereas b, y and c are also in G.P. Show that : x^2, b^2, y^2 are in A.P.

a, b, c in A.P. $\Rightarrow 2b = a + c$,
a, x, b in G.P. $\Rightarrow x^2 = ab$
and b, y, c are in G.P. $\Rightarrow y^2 = bc$

$$x^2 + y^2 = ab + bc$$
$$= b(a + c) = b \times 2b = 2b^2$$

$\therefore$ x^2, b^2 and y^2 are in A.P.

8. If a, b, c are in G.P. and a, x, b, y, c are in A.P., prove that :

(i) $\dfrac{1}{x} + \dfrac{1}{y} = \dfrac{2}{b}$ (ii) $\dfrac{a}{x} + \dfrac{c}{y} = 2.$

9. If a, b and c are in A.P. and also in G.P., show that : $a = b = c$.

$2b = a + c$ and $b^2 = ac \Rightarrow \left(\dfrac{a+c}{2}\right)^2 = ac$

On simplifying, it will give $a = c$
and then $2b = a + c = a + a = 2a \Rightarrow b = a$

1. Find the sum of G.P. :

(i) $1 + 3 + 9 + 27 + \ldots\ldots$ to 12 terms.

(ii) $0.3 + 0.03 + 0.003 + 0.0003 + \ldots\ldots$ to 8 terms.

(iii) $1 - \dfrac{1}{2} + \dfrac{1}{4} - \dfrac{1}{8} + \ldots\ldots$ to 9 terms.

(iv) $1 - \dfrac{1}{3} + \dfrac{1}{3^2} - \dfrac{1}{3^3} + \ldots\ldots$ to n terms.

(v) $\dfrac{x+y}{x-y} + 1 + \dfrac{x-y}{x+y} + \ldots\ldots$ upto n terms.

(vi) $\sqrt{3} + \dfrac{1}{\sqrt{3}} + \dfrac{1}{3\sqrt{3}} + \ldots\ldots$ to n terms.

2. How many terms of the geometric progression $1 + 4 + 16 + 64 + \ldots\ldots$ must be added to get sum equal to 5461 ?

3. The first term of a G.P. is 27 and its 8th term is $\dfrac{1}{81}$. Find the sum of its first 10 terms.

4. A boy spends ₹ 10 on first day, ₹ 20 on second day, ₹ 40 on third day and so on. Find how much, in all, will he spend in 12 days ?

G.P. formed is : ₹ 10 + ₹ 20 + ₹ 40 + ...

5. The 4th and the 7th terms of a G.P. are $\dfrac{1}{27}$ and $\dfrac{1}{729}$ respectively. Find the sum of n terms of this G.P.

6. A geometric progression has common ratio = 3 and last term = 486. If the sum of its terms is 728; find its first term.

7. Find the sum of G.P. : 3, 6, 12, ..., 1536.

8. How many terms of the series $2 + 6 + 18 + \ldots\ldots$ must be taken to make the sum equal to 728 ?

9. In a G.P., the ratio between the sum of first three terms and that of the first six terms is 125 : 152. Find its common ratio.

Given : $\dfrac{a(r^3 - 1)}{r - 1} : \dfrac{a(r^6 - 1)}{r - 1} = 125 : 152$.

10. Find how many terms of G.P. $\dfrac{2}{9} - \dfrac{1}{3} + \dfrac{1}{2} \ldots\ldots\ldots$ must be added to get the sum equal to $\dfrac{55}{72}$?

11. If the sum of $1 + 2 + 2^2 + \ldots\ldots + 2^{n-1}$ is 255, find the value of n.

12. Find the geometric mean between :

(i) $\dfrac{4}{9}$ and $\dfrac{9}{4}$ (ii) 14 and $\dfrac{7}{32}$

(iii) $2a$ and $8a^3$

13. The sum of three numbers in G.P. is $\dfrac{39}{10}$ and their product is 1. Find the numbers.

14. The first term of a G.P. is -3 and the square of the second term is equal to its 4th term. Find its 7th term.

15. Find the 5th term of the G.P. $\dfrac{5}{2}$, 1, ...

16. The first two terms of a G.P. are 125 and 25 respectively. Find the 5th and the 6th terms of the G.P.

17. Find the sum of the sequence $-\dfrac{1}{3}$, 1, -3, 9, ... upto 8 terms.

18. The first term of a G.P. in 27. If the 8th term be $\dfrac{1}{81}$, what will be the sum of 10 terms ?

19. Find a G.P. for which the sum of first two terms is -4 and the fifth term is 4 times the third term.