RD Sharma Class 11 Solutions Chapter 20 Geometric Progressions Ex 20.1 Q 4

$$\frac{2}{27}, \frac{2}{9}, \frac{2}{3}, \ldots .162$$

n^{th} term from the end

$$a_n = l\left(\frac{1}{r}\right)^{n-1}$$

$$l = 162, r = \text{common ratio} = \frac{t_2}{t_1}$$

$$= \frac{\frac{2}{9}}{\frac{2}{27}} = 3$$

$$n = 4$$

$$t_4 = (162)\left(\frac{1}{3}\right)^3$$

$$= \frac{162}{27}$$

$$= 6$$

Solutions Of Geometric Progressions Ex 20.1 Q 5

$$0.004, 0.02, 0.1, \ldots \text{ is } 12.5$$

Here,

$$a = 0.004, \qquad t_n = 12.5$$

$$r = \frac{t_2}{t_1} = \frac{0.02}{0.004} = 5$$

$$t_n = ar^{n-1}$$

$$12.5 = (0.004)(5)^{n-1}$$

$$\frac{12.5}{0.004} = (5)^{n-1}$$

$$\frac{125 \times 100}{4} = 5^{n-1}$$

$$5^5 = 5^{n-1}$$

$$= n - 1$$

$$n = 6$$

Solutions Of Geometric Progressions Ex 20.1 Q 6

$\sqrt{2}, \frac{1}{\sqrt{2}}, \ldots$ is $\frac{1}{512\sqrt{2}}$

$$t_n = ar^{n-1}$$

$$a = \sqrt{2},\ r = \frac{t_n}{t_{n-1}} = \frac{t_2}{t_1} = \frac{\frac{1}{\sqrt{2}}}{\sqrt{2}} = \frac{1}{2}$$

$$t_n = \frac{1}{512\sqrt{2}},\ n = ?$$

$$t_n = ar^{n-1}$$

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

$$\frac{1}{512 \times \sqrt{2} \times \sqrt{2}} = \left(\frac{1}{2}\right)^{n-1}$$

$$\frac{1}{1024} = \left(\frac{1}{2}\right)^{n-1}$$

$$\left(\frac{1}{2}\right)^{10} = \left(\frac{1}{2}\right)^{n-1}$$

$$10 = (n-1)$$

$$n = 11$$

$\therefore$ term is 11^{th}.

Solutions Of Geometric Progressions Ex 20.1 Q 6 i

$2, 2\sqrt{2}, 4, \ldots$ is 128

$$a = 2,\ r = \frac{t_n}{t_{n-1}} = \frac{2\sqrt{2}}{2} = \sqrt{2},\ n = ?$$

$$t_n = 128$$

Also,

$$t_n = ar^{n-1}$$

$$128 = (2)\left(\sqrt{2}\right)^{n-1}$$

$$\frac{128}{2} = \left(\sqrt{2}\right)^{n-1}$$

$$64 = \left(\sqrt{2}\right)^{n-1}$$

$$(2)^6 = \left(\sqrt{2}\right)^{n-1}$$

$$\Rightarrow \quad 12 = n - 1$$

$$n = 13$$

$\therefore$ 13^{th} term is 128.

Solutions Of Geometric Progressions Ex 20.1 Q 6 ii

$\sqrt{3}, 3, 3\sqrt{3}, \ldots, 729$

$$a = \sqrt{3},\ r = \frac{t_n}{t_{n-1}},\ n = ?,\ t_n = 729$$

Now,

$$t_n = ar^{n-1}$$

$$729 = \left(\sqrt{3}\right)(r)^{n-1}$$

Now,

$$r = \frac{t_2}{t_1} = \frac{3}{\sqrt{3}} = \sqrt{3}$$

$$729 = \left(\sqrt{3}\right)\left(\sqrt{3}\right)^{n-1}$$

$$729 = \left(\sqrt{3}\right)^{n}$$

$$(3)^6 = \left(\sqrt{3}\right)^{n}$$

$$\left(\sqrt{3}\right)^{12} = \left(\sqrt{3}\right)^{n}$$

$$\Rightarrow \quad n = 12$$

$\therefore$ 12^{th} term is 729.

Solutions Of Geometric Progressions Ex 20.1 Q 6 iii

$$\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots, \frac{1}{19683}$$

$$a = \frac{1}{3},\ r = \frac{t_n}{t_{n-1}} = \frac{t_2}{t_1} = \frac{\frac{1}{9}}{\frac{1}{3}} = \frac{1}{3},\ t_n = \frac{1}{19683},\ n = ?$$

Now,

$$t_n = ar^{n-1}$$

$$\frac{1}{19683} = \left(\frac{1}{3}\right)\left(\frac{1}{3}\right)^{n-1} = \left(\frac{1}{3}\right)^n$$

$$\left(\frac{1}{3}\right)^9 = \left(\frac{1}{3}\right)^n$$

$$\Rightarrow \quad n = 9$$

$\therefore$ 9^{th} term of G.P is $\frac{1}{19683}$.

*********** END **********