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RD Sharma Class 11 Solutions Chapter 20 Geometric Progressions Ex 20.1 Q 1

(i) $4, -2, 1, -\frac{1}{2}, \ldots$

$$\frac{t_n}{t_{n-1}} = r = \text{common ratio} \qquad \text{---(i)}$$

$$\frac{t_2}{t_1} = \frac{-2}{4} = \frac{-1}{2}$$

$$\frac{t_3}{t_2} = \frac{1}{-2} = \frac{-1}{2}$$

(ii) $\frac{-2}{3}, -6, -54, \ldots$

Using (i)

$$\frac{t_2}{t_1} = \frac{-6}{\frac{-2}{3}} = \frac{18}{2} = 9$$

$$\frac{t_3}{t_2} = \frac{-54}{-6} = 9$$

$\therefore \qquad r = 9$

(iii) $a, \frac{3a^2}{4}, \frac{9a^3}{16}, \ldots$

Using (i)

$$\frac{t_3}{t_2} = \frac{\frac{9a^3}{16}}{\frac{3a^2}{4}} = \frac{9a^3}{16} \times \frac{4}{3a^2} = \frac{3a}{4}$$

$$\frac{t_2}{t_1} = \frac{\frac{3a^2}{4}}{a} = \frac{3a^2}{a}$$

$\therefore \qquad r = \frac{3}{4}a$

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(iii) $a, \frac{3a^2}{4}, \frac{9a^3}{16}, \ldots$

Using (i)

$$\frac{t_3}{t_2} = \frac{\frac{9a^3}{16}}{\frac{3a^2}{4}} = \frac{9a^3}{16} \times \frac{4}{3a^2} = \frac{3a}{4}$$

$$\frac{t_2}{t_1} = \frac{\frac{3a^2}{4}}{a} = \frac{3a^2}{a}$$

$$\therefore \qquad r = \frac{3}{4}a$$

(iv) $\frac{1}{2}, \frac{1}{3}, \frac{2}{9}, \frac{4}{27} \ldots$

Using (i)

$$\frac{t_3}{t_2} = \frac{\frac{2}{9}}{\frac{1}{3}} = \frac{2}{3}$$

$$\frac{t_2}{t_1} = \frac{\frac{1}{3}}{\frac{1}{2}} = \frac{2}{3}$$

$$\therefore \qquad r = \frac{2}{3}$$

RD Sharma Class 11 Solutions Chapter 20 Geometric Progressions Ex 20.1 Q 2

$$an = \frac{2}{3n}, n \in N$$

Put $n = 1, 2, 3 \ldots$ because n is natural number

$$\frac{2}{3}, \frac{2}{3^2}, \frac{2}{3^3}, \ldots$$

$$\frac{t_3}{t_2} = \frac{\frac{2}{3^3}}{\frac{2}{3^2}} = \frac{1}{3}$$

$$\frac{t_2}{t_1} = \frac{\frac{2}{3^2}}{\frac{2}{3}} = \frac{1}{3}$$

Ratio of consecutive terms is solve

$\therefore \qquad \frac{1}{3}$ is common ratio, Hence it is G.P $\forall n \in N$.

RD Sharma Class 11 Solutions Chapter 20 Geometric Progressions Ex 20.1 Q 3

(i) 9^{th} term of G.P $1, 4, 16, 64, \ldots$

$$t_1 = 1 = a$$
$$t_2 = 4$$

Because it is G.P

$$\frac{t_2}{t_1} = \text{common ratio} = r$$
$$r = \frac{4}{1} = 4$$
$$t_n = ar^{n-1}$$
$$t_9 = ar^8 = 1(4)^8 = 4^8$$

(ii) 10^{th} term of G.P $\frac{-3}{4}, \frac{1}{2}, \frac{-1}{3}, \frac{2}{4}, \ldots$

$$a = \frac{-3}{4}$$

Because it is G.P

$$\therefore \quad r = \frac{t_2}{t_1} = \frac{\frac{1}{2}}{\frac{-3}{4}} = \frac{-2}{3}$$
$$t_n = ar^{n-1}$$
$$t_{10} = ar^9 = \left(\frac{-3}{4}\right)\left(\frac{-2}{3}\right)^9 = \frac{1}{2}\left(\frac{2}{3}\right)^8$$

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(iv) 12^{th} term of G.P $\frac{1}{a^3x^3}, ax, a^5x^5, \ldots$

$$a = \frac{1}{a^3x^3}$$

$$r = \frac{t_n}{t_{n-1}} = \frac{t_2}{t_1} = \frac{ax}{\frac{1}{a^3x^3}} = a^4x^4$$

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

$$t_{12} = ar^{11}$$

$$= \left(\frac{1}{a^3x^3}\right)\left(a^4x^4\right)^{11}$$

$$= (ax)^{41}$$

(v) n^{th} term of G.P $\sqrt{3}, \frac{1}{\sqrt{3}}, \frac{1}{3\sqrt{3}}, \ldots$

$$r = \frac{t_n}{t_{n-1}} = \frac{t_2}{t_1} = \frac{\frac{1}{\sqrt{3}}}{\sqrt{3}} = \frac{1}{3}$$

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

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

(vi) 10^{th} term of G.P $\sqrt{2}, \frac{1}{\sqrt{2}}, \frac{1}{2\sqrt{2}}, \ldots$

$$a = \sqrt{2}$$

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

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

$$t_{10} = ar^9$$

$$= \left(\sqrt{2}\right)\left(\frac{1}{2}\right)^9$$

$$= \frac{1}{\sqrt{2}}\left(\frac{1}{2}\right)^8$$

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