

Geometric Progression

Formula sheet

→ General Term of AP

→ $a_n = ar^{n-1}$

→ nth Term from the end of GP

→ nth term from the end = $l \left(\frac{1}{r}\right)^{n-1}$

→ Selection of terms in GP

<u>number of terms</u>	<u>Terms</u>	<u>common ratio</u>
→ 3	$\frac{a}{r}, a, ar$	r
→ 4	$\frac{a}{r^3}, \frac{a}{r}, ar, ar^3$	r^2
→ 5	$\frac{a}{r^2}, \frac{a}{r}, a, ar, ar^2$	r

→ Sum of n terms

→ $S_n = \frac{a(r^n - 1)}{r - 1}$

Date _____
Page _____

Q6. In a GP, the first term is 24 and 5th term is 8. Find the ninth term of the GP

$$\rightarrow a = 24$$

$$ar^4 = 8$$

$$24r^4 = 8$$

$$r^4 = \frac{8}{24}$$

$$r^4 = \frac{1}{3}$$

$$r^4 = \frac{1}{3}$$

$$ar^8 = a(r^4)^2$$

$$= 24 \left(\frac{1}{3} \right)^2$$

$$= 24 \times \frac{1}{3} \times \frac{1}{3}$$

$$= 24 \times \frac{1}{3} \times \frac{1}{3}$$

$$a_9 = \frac{8}{3}$$

=) ans

Q7 The 4th, 6th and the last terms of a GP are 10, 40, and 640, respectively. If the common ratio is positive, then find the first term, common ratio and the number of terms of the series

→ $a_4 = 10$
 $ar^3 = 10$
 $ar^6 = 40$
 $ar^5 = 40$
 $ar^{n-1} = 640$

$$\frac{ar^3}{ar^5} = \frac{10}{40}$$

$$\frac{1}{r^2} = \frac{1}{4}$$

$$\frac{1}{r} = \sqrt{\frac{1}{4}}$$

$$\frac{1}{r} = \frac{1}{2}$$

⇒ $r = 2$

$$ar^3 = 10$$

$$a \cdot 2^3 = 10$$

$$a = \frac{10}{2 \times 2 \times 2} = \frac{5}{4}$$

$$ar^{n-1} = 640$$

$$\frac{5}{4} \cdot 2^{n-1} = 640$$

$$2^{n-1} = \frac{640 \times 4}{5}$$

$$2^{n-1} = 512$$

$$2^{n-1} = 2^7 \times 2^2$$

$$2^{n-1} = 2^9$$

$$\Rightarrow n-1 = 9$$

$$n = 9 + 1$$

$$n = 10$$

$$2 \overline{) 128}$$

$$2 \overline{) 64}$$

$$2 \overline{) 32}$$

$$2 \overline{) 16}$$

$$2 \overline{) 8}$$

$$2 \overline{) 4}$$

$$2 \overline{) 2}$$

Answers:

$$a = \frac{5}{2}$$

$$r = 2$$

$$n = 10$$