

## Geometric Progressions Ex 20.2 Q1

Let the three number in G.P be  $\frac{a}{r}$ , a, ar

Sum of these numbers = 
$$\frac{a}{r} + a + ar = 65$$

3375 = Product of these numbers

$$3375 = \left(\frac{a}{r}\right)(a)(ar) = a^3$$

$$a^3 = (5)^3 \times (3)^3 = (15)^3$$
  
 $a = 15$ 

$$a\left(\frac{1}{r} + 1 + r\right) = 65$$

$$15\left(\frac{1}{r} + 1 + r\right) = \frac{65}{15} = \frac{13}{3}$$

$$\frac{1+r+r^2}{r} = \frac{13}{3}$$

$$3 + 3r + 3r^2 = 13r$$

$$3r^2 - 10r + 3 = 0$$

$$3r^2 - r - 9r + 3 = 0$$

$$r(3r-1)-3(3r-1)=0$$

$$r = 3$$
,  $\frac{1}{3}$   $r = \frac{1}{3}$  or  $r = 3$ 

- ∴ G.P. is a, ar, ar<sup>2</sup>
- ∴ G.P. is 45,15,5 or 5,15,45

Geometric Progressions Ex 20.2 Q 2

Let the three numbers be  $a, ar, ar^2$  in G.P., where a is first teror and r is the common ratio.

Then, 
$$a + ar + ar^2 = 38$$

$$a \left( 1 + r + r^2 \right) = 38$$
and
$$(a) \left( ar \right) \left( ar \right)^2 = 1728$$

$$a^3 r^3 = 1728 = 4^3 3^3 = (12)^3$$

$$a^3 = \frac{12^3}{r^3} \Rightarrow \frac{12}{r} = a$$

Putting 
$$a = \frac{12}{r}$$
 in (i)  

$$\frac{12}{r} \left( 1 + r + r^2 \right) = 38$$

$$12 + 12r + 12r^2 = 38r$$

$$12r^2 - 26r + 12 = 0$$

$$6r^2 - 13r + 6 = 0$$

$$6r^2 - 9r - 4r + 6 = 0$$

$$3r \left( 3r - 3 \right) - 2 \left( 3r - 3 \right) = 0$$

$$r = \frac{3}{2}, \frac{2}{3}$$

$$a = \frac{12}{3} = 8 \text{ or } \frac{12}{3} = 18$$

∴ G.P. is 8,12,18.

Geometric Progressions Ex 20.2 Q 3

Let the first three terms of G.P. are  $\frac{a}{r}$ , a, ar

$$\frac{a}{r} + a + ar = \frac{13}{12} \qquad ---(i)$$
and 
$$\frac{a}{r} \times a \times ar = -1$$

$$\Rightarrow a^3 = -1$$

$$\Rightarrow a = -1$$
Put  $a = -1$  in equation (i),
$$\frac{-1}{r} + (-1) - r = \frac{13}{12}$$

$$\Rightarrow -1 - r - r^2 = \frac{13}{12}r$$

$$\Rightarrow -12 - 12r - 12r^2 = 13r$$

$$\Rightarrow 12r^2 + 12r + 13r + 12 = 0$$

$$\Rightarrow 12r^2 + 25r + 12 = 0$$

$$\Rightarrow 12r^2 + 16r + 9r + 12 = 0$$

$$\Rightarrow 4r(3r + 4) + 3(3r + 4) = 0$$

$$\Rightarrow (4r + 3)(3r + 4) = 0$$

$$r = \frac{-3}{4}, \frac{-4}{3}$$
So,

Required G.P. is,  $\frac{4}{3}$ ,  $-1$ ,  $\frac{3}{4}$ , ...

Geometric Progressions Ex 20.2 Q4

 $\frac{3}{4}$ , -1,  $\frac{4}{3}$ , ...

Let the three numbers in G.P. be  $\frac{a}{r}$ , a, ar then product of these numbers  $\left(\frac{a}{r}\right)(a)(ar)$ 

$$\Rightarrow a^3 = 125 = 5^3$$
  
 $a = 5$ 

Also, sum of these products in pair

$$\left(\frac{a}{r}\right)(a) + (a)(ar) + \left(\frac{a}{r}\right)(ar) = 87\frac{1}{2} = \frac{195}{2}$$

$$\frac{a^2}{r} + a^2r + a^2 = a^2\left(\frac{1}{r} + r + 1\right)$$

$$= (5)^2\left(\frac{1+r^2+r}{r}\right) = \frac{195}{2}$$

$$1+r^2+r = \left(\frac{195}{2 \times 25}\right)^r$$

$$2\left(1+r^2+r\right) = \frac{39}{5}r$$

$$10+10r^2+10r=39r$$

$$10r^2-29r+10=0$$

$$10r^2-25r-4r+10=0$$

$$5r(2r-5)-2(2r-5)=0$$

$$r = \frac{5}{2}, \frac{2}{5}$$

$$\therefore \quad \text{G.P. is } \frac{a}{r}, a, ar$$
 
$$10, 5, \frac{5}{2}, \dots \text{ or } \frac{5}{2}, 5, 10, \dots$$

\*\*\*\*\*\*\*\*\* END \*\*\*\*\*\*\*\*