

11.9.3.17

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Question: If the 4^{th} , 10^{th} and 16^{th} terms of a G.P. are x , y , and z , respectively. Prove that x , y , z are in G.P.

Solution:

The n^{th} term of a G.P. is $a_n = a_1 r^{n-1}$. Given that x , y , z are the 4^{th} , 10^{th} and 16^{th} terms of a G.P.,

$$x = a_4 = ar^{4-1} = ar^3$$

$$y = a_{10} = ar^{10-1} = ar^9$$

$$z = a_{16} = ar^{16-1} = ar^{15}$$

Consider $\frac{y}{x}$ and $\frac{z}{y}$;

$$\frac{y}{x} = \frac{ar^9}{ar^3} \quad (1)$$

$$\frac{y}{x} = r^6 \quad (2)$$

$$\frac{z}{y} = \frac{ar^{15}}{ar^9} \quad (3)$$

$$\frac{z}{y} = r^6 \quad (4)$$

Since, $\frac{y}{x} = \frac{z}{y}$;

x , y , z are in G.P.