

If the 2nd, 5th and 9th terms of a non-constant A.P. are in G.P., then the common ratio of this G.P. is:

- (1) $\frac{8}{5}$
- (2) $\frac{4}{3}$
- (3) 1
- (4) $\frac{7}{4}$

Based on JEE Main 2016
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$t_2 = a + d$, $t_5 = a + 4d$, $t_9 = a + 8d$ are in G.P

So, $\frac{t_5}{t_2} = \frac{t_9}{t_5} = r$ (common ratio)

$$\therefore \frac{a + 4d}{a + d} = \frac{a + 8d}{a + 4d} = r$$

$$\therefore \frac{a + 4d}{a + d} = \frac{a + 8d}{a + 4d} = \frac{(a + 8d) - (a + 4d)}{(a + 4d) - (a + d)} = r$$

(using the property of ratio & proportion)

$$\therefore r = \frac{4d}{3d} = \frac{4}{3}$$

Hence, Option (2).