1 **JEE Main 2020 (Online) 2nd September Evening Slot**

Numerical

If the variance of the terms in an increasing A.P.,

b_1 , b_2 , b_3 ,....,b_{11} is 90, then the common difference of this A.P. is_____.

Answer

Correct Answer is **3**

Explanation

Let the common difference = d

and $b_1 = a$

$b_2 = a + d$

$b_3 = a + 2d$

... $b_{11} = a + 10d$

Variance = $\frac{\sum a_i^2}{11} - \left(\frac{\sum a_i}{11}\right)^2 = 90$

$\Rightarrow \frac{a^2+(a+d)^2+...+(a+10d)^2}{11} - \left(\frac{a+(a+d)+...+(a+10d)}{11}\right)^2 = 90$

$\Rightarrow 11\left[11a^2 + 385d^2 + 110ad\right] - \left[11a + 55d\right]^2 = 10890$

$\Rightarrow 1210d^2 = 10890$

$\Rightarrow d^2 = 9$

$\Rightarrow d = \pm 3$

As A.P is increasing so d should be positive