

The distance travelled by a ball dropped from a height are $128/9$, $32/3$, 8 , 6 , ... How much distance will it travel before coming to rest?

Solution:

The total distance travelled by the ball
 $= \frac{128}{9} + \frac{32}{3} + 8 + 6 + \dots$

This is an infinite GP with first term as $\frac{128}{9}$
 and common difference $= \frac{3}{4}$

$$\therefore \text{The required distance} = \frac{a}{1-r} = \frac{128/9}{1-3/4}$$

$$= \frac{128}{9} \times 4 = \frac{512}{9} \text{ m}$$