

# Complete Journey of a Minute Hand

RANJIT DESAI

We are familiar with wall clocks. We discuss here the movement of the minute hand of a wall clock that behaves differently from the usual kind of clock.

Let the minute hand of this different clock start to move from some position. We say that it has “completed the journey” when it returns to its starting position for the first time.

In a usual clock, the minute hand moves 1 minute/60 seconds. In our clock, we shall suppose that the minute hand jumps through  $m$  minutes/60 seconds, where  $m$  is a whole number between 1 and 60. We shall say that “the minute hand moves stepwise with step value  $m$ .”

We discuss here the number of steps taken by the minute hand to complete the journey. We claim the following.

- If  $m$  is a divisor of 60, then the minute hand takes  $60/m$  steps to complete its journey. This is so because  $m \times \frac{60}{m} = 60$ .
- If  $m$  is not a divisor of 60, then we compute the number  $k = \frac{\text{LCM}(m,60)}{m}$ . The number of steps taken by the minute hand to complete its journey will then be  $k$ .

## Examples

- For  $m = 7$ , we get  $k = \frac{\text{LCM}(7,60)}{7} = \frac{420}{7} = 60$ ; so 60 steps are required to complete the journey.
- For  $m = 8$ , we get  $k = \frac{\text{LCM}(8,60)}{8} = \frac{120}{8} = 15$ ; so 15 steps are required to complete the journey.

*Keywords: Clock, stepwise movement.*



**RANJIT DESAI** started his career as a mathematics teacher in Bai Avabai High School, Valsad in 1960, and retired in 1998 as Incharge of P. G. Centre (Mathematics) from B. K. M. Science College, Valsad. In 1968, he started the Ganit Milan to connect students and teachers of schools and colleges with one another. He is actively associated with the Gujarat Ganit Mandal. He may be contacted at [ranjitraimdesai@gmail.com](mailto:ranjitraimdesai@gmail.com)