

MATHCOUNTS 2011-2012 Newsletter Problem

On Forux one full day lasts 34 hours, 17 hours of light and 17 hours of darkness. It is currently the beginning of the 24th hour (23:00) of the day on both Forux and Earth. After how many hours will the time on Forux and the time on Earth next be same?

Solution

The times on Earth start over after each 24-hour period and the times on Forux have a 34-hour cycle. The LCM of 24 and 34 is 408. Therefore, at the end of the 408th hour after the time is 23:00 on both Forux and Earth, the time will again be 23:00 on both planets. But this is not the next instance of the time being the same on Earth and Forux; this is just when the time is next 23:00 on both planets. Twenty-three hours earlier it was the beginning of the 1st hour (00:00) of the day on both Earth and Forux. That means the time will next be the same on Earth and on Forux after $408 - 23 = \mathbf{385}$ hours.