PUZZLING CARTOON

- RIGHT ON TIME -

AMAZINGMATHS

Materials:

- Video of the puzzle
- Sheets of paper
- Pencils
- Written copies of the puzzle (optional)

The puzzle

Charles' and Stephanie's watches are broken.
Charles' indicates 7:00 p.m. but gains 10 minutes every hour.

Stephanie's watch indicates 5:00 p.m. but loses 10 minutes every hour.

We know that Charles and Stephanie set their watches to the right time at the same moment.

What time is it currently?

Source : *100 casse-tête et problèmes de logique*, Larousse, 2011.

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PUZZLE SOLUTION

The answer:

It is currently 6 p.m.

Detailed Explanations

First Solution

We have to go through an intermediate step: find the time at which the watches were set. To do that, we go back in time, hour after hour, considering each watch's malfunction. We must consider inverse operations. Indeed, if Stephanie's watch loses 10 minutes when we advance one hour, then when we go back one hour, we have to add 10 minutes. Thus, if we go back one hour, Stephanie's watch indicates 4:10 p.m. and Charles' watch indicates 5:50 p.m. One hour earlier, the watches indicated 3:20 p.m. and 4:40 p.m. respectively. We keep going that way until both watches indicate the same time: it is the time at which they synchronized their watches, which is 12 p.m. We now know at what time the watches were set and the number of real hours that went by since (it is the number of steps used in the process of finding the time of the setting, meaning 6). The current time is then 12:00 + 6 hours = 6:00 p.m.

Second solution

Since one of the two watches gains 10 minutes every hour and that the other one loses 10 minutes every hour, then, every time an hour goes by, the gap between the hours indicated by the two watches increases of 20 minutes.

Since there is a gap of 2 hours at the moment the two watches broke, this means that 120 ÷ 20 = 6 hours went by since the two watches were set on the right time. So, the watch that gains time gained 6 times 10 minutes = 60 minutes. Since it indicates 7 p.m., we subtract these 60 minutes to obtain the real time, that is 6 p.m.

We can apply the same reasoning to the watch that loses time every hour. It lost 6 times 10 minutes, that is one hour. Since it indicates 5 p.m., we add an hour to obtain the real time, that is 6 p.m.