

PUZZLING CARTOON

- BLAME IT ON THE WATCH -



Materials:

- Video of the puzzle
- Pen and paper

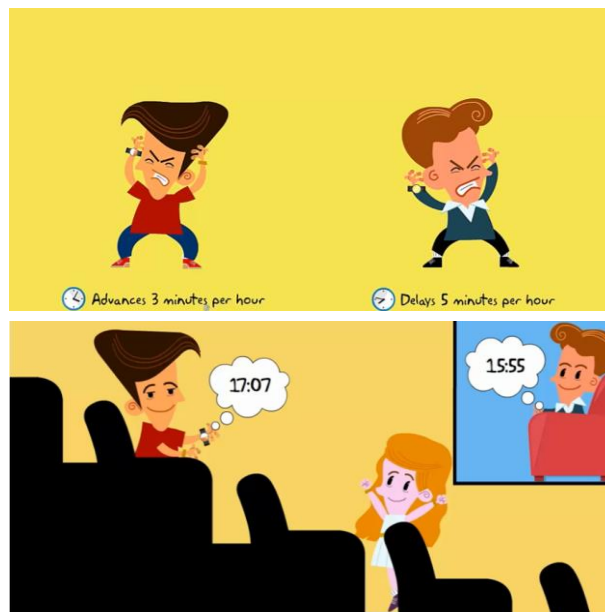
The Puzzle

Tommy, Billy, and Julie are very excited because tonight they will finally see their musical idol Justine Believer!

To make sure they are on time at the concert, they set up a meeting time before the show.

To make sure they arrive to their meeting on time, Tommy, Billy, and Julie synchronize their watches at the same time. What they don't know is that Tommy's watch advances by 3 minutes every hour and Billy's watch sets itself back by 5 minutes every hour.

When Julie arrives at the concert hall, Tommy is already at his seat because his watch indicates 17:07. Meanwhile, Billy is still at his house because his watch indicates 15:55.



- Question 1: At what time were Tommy, Billy, and Julie's supposed to meet?
Question 2: At what time did Tommy, Billy, and Julie synchronize their watches?



PUZZLE SOLUTION



The answer:

Question 1: Tommy, Billy, and Julie were supposed to meet at 16:40.

Question 2: Tommy, Billy, and Julie synchronized their watches at 7:40 in the morning.

Possible solution:

There are several ways to solve this problem. Here is one possible solution:

Question 1: At what time were Tommy, Billy, and Julie supposed to meet?

Let's start by noticing the regularity: After every hour, Tommy's watch advances by 3 minutes and Billy's watch sets back by 5 minutes. Therefore, with **every passing hour an 8-minute gap is created**.

I.e.: If, at noon, both watches are synchronized to the same time, here is how the gap between both watches will develop:

Real Time	Time on the watch of		Gap between both watches (in minutes)
	Tommy	Billy	
12h00	12h00	12h00	0
13h00	13h03	12h55	8
14h00	14h06	13h50	16
15h00	15h09	14h45	24
...

To find the meeting time set among the three friends, we must determine the gap (in minutes) between the time indicated on Tommy's watch and the time indicated on Billy's watch.

Tommy's watch indicates 17:07 while Billy's watch indicates 15:55. Therefore, we know that there is a 72-minute difference between both watches. We also know that a difference of 8 minutes is created every hour.

With this information, we can determine how long ago the difference between both watches began:

$$72 \text{ minutes} \div 8 \text{ minutes/hour} = 9 \text{ hours.}$$

We can now find the time of the meeting.

If we base ourselves on Tommy's watch:

For every hour, over the last 9 hours, Tommy's watch has been advancing by 3 minutes. So, after 9 hours, Tommy's watch is **ahead by 27 minutes** ($3 \text{ minutes} \times 9 \text{ hours} = 27 \text{ minutes}$). Therefore, **Tommy arrived 27 minutes early to the meeting**.

When Julie arrived (at the right time), Tommy's watch indicated 17:07. Therefore, we find that their appointment time was set for **16:40** ($17:07 - 27 \text{ minutes} = 16:40$).

If we base ourselves on Billy's watch:

By the same principle, for every hour over the last 9 hours, Billy's watch has been setting itself back by 5 minutes. So, after 9 hours, Billy's watch is **late by 45 minutes** ($5 \text{ minutes} \times 9 \text{ hours} = 45 \text{ minutes}$). Therefore, **Billy arrived 45 minutes late to the meeting**.

When Julie arrived (at the right time), Billy's watch indicated 15:55. Therefore, we find that their appointment time was set for **16:40** ($15:55 + 45 \text{ minutes} = 16:40$).

Question 2: At what time did they synchronize their watches?

We know that the 3 watches were synchronized 9 hours before their meeting time. Since their meeting was scheduled for 16:40, their watches were synchronized at **7:40** in the morning.

$$16:40 - 9 \text{ hours} = 7:40$$

N.B. The resolution of Question 1 is not required for the resolution of Question 2. You may start by solving one or the other or, you may simply solve one of the two questions.