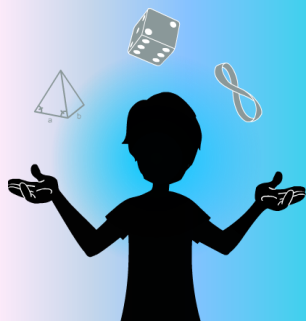


PUZZLING CARTOON

- BRIDGE CROSSING -



AMAZINGMATHS

Materials:

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

The puzzle

Four people have to cross a bridge as quickly as possible. The bridge can only support the weight of two people at a time.



It is night-time and it is impossible to cross the bridge without a lamp. However, the four people only have one lamp. Each person has a maximum speed. Albert can cross the bridge in one minute. Bertha can do it in two minutes. Carole needs five minutes. Diane crosses the bridge in ten minutes.



This means that, for example, if Diane and Albert cross the bridge together, it will take them ten minutes.

How much time, at a minimum, will it take for everyone to cross?

Source : *Énigmes Mathématiques Diaboliques*, de Sylvain Lhullier.



PUZZLE SOLUTION



The answer:

Albert and Bertha cross first, which takes 2 minutes. Albert brings the lamp back, since he is the fastest of the two. Three minutes went by since the start.

Carole and Diane cross the bridge together. A total of 13 minutes went by. Bertha brings the lamp back, which gets the number of minutes that went by to 15 minutes. Finally, Albert and Bertha cross the bridge in two minutes and the total time that went by since the start is 17 minutes.

Detailed Explanations

To get to the solution that will allow everyone to cross in a minimum time, we have to consider this:

- One person only will bring the lamp back to the starting point after crossing the bridge and she must be the fastest one possible. So, this role will be played by either Albert or Bertha. We need to have them cross first so both of them can be available to go back onto the starting bank.
- Diane's time will necessarily be part of the sum since she is the slowest. She has to cross with the second slowest (Carole), this way Carole's time will not be part of the total time's sum.

Note: some students could mention the eventuality in which one of the characters carries another character in his arms. Then, one possibility is to encourage the student in this way: what will be the minimum time then? The answer is 5 minutes (considering it is Albert that does two round-trips, then one one-way). We then ask the student to do it the other way, considering that all the characters must walk.