



The Airplane Riddle

00:00-01:37

TEDEd

CAN YOU SOLVE THE AIRPLANE RIDDLE?

HOW SHOULD THE THREE PLANES COORDINATE SO THE PROFESSOR CAN FLY CONTINUOUSLY FOR THE WHOLE TRIP, WITHOUT ANYONE RUNNING OUT OF FUEL AND CRASHING?

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1. The professor's plane must make a single continuous trip around the world without landing or turning around.
2. Each plane can travel exactly 1 degree of longitude in 1 minute for every kiloliter of fuel. Each can hold a maximum of 180 kiloliters of fuel.
3. Any plane can refuel any of the others in mid-air by meeting at the same point and instantly transferring any amount of fuel.
4. Fugori and Orokana's planes can turn around instantaneously without burning fuel.
5. Only one airport is available for any of the planes to land, take off, or refuel.
6. All three planes must survive the experiment, and none may run out of fuel in mid-air.

Vocabulary

un huitième: one eighth
un voyage: a journey
atterrir: to land
décoller: to take off
atteindre: to reach
être plein de: to be loaded with
contenir: to hold
se ravitailler (en carburant): to refuel
une jauge: gauge (pronunciation [gei])
invariablement: consistently
à condition que: provided
être à court de, venir à manquer de: to run out of
de justesse, de peu, à un cheveu près: by a hair
réussir, y arriver: to pull it off

Stress Placement

coordinate
calculate
calculations
permission
located
continuously
professor
identical
experiment

Hypotheses :

All three planes take off at noon flying west, each fully loaded with 180 kiloliters. After 45 minutes, or one-eighth of the way around, each plane has 135 kl left. Orokana gives 45 to the professor and 45 to Fugori, fully refueling them both. With her remaining 45 Orokana returns to the airport. 45 minutes later, with one-quarter of the trip complete, the professor and Fugori are both at 135 kiloliters again. Fugori transfers 45 into the professor's tank, leaving himself with the 90 he needs to return. At 15:00 Orokana takes off, this time flying east. At this point exactly 180 minutes have passed and the professor is at the halfway point of his journey, with 90 kiloliters of fuel left. The two planes meet at the three-quarter mark. Just as the professor's fuel is about to run out, Orokana gives him 45 kiloliters of her remaining 90, leaving them with 45 each. But that's just half what they need to make it to the airport. Fortunately, this is exactly when Fugori, having refueled, takes off. 45 minutes later, just as the other two planes are about to run empty, he meets them at the 315 degree point and transfers 45 kiloliters of fuel to each, leaving 45 for himself. All three planes land at the airport just as their fuel gauges reach zero.