

Warm-Up: Travellers

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Instructor's Handout

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Problem 1:

Four travellers are on a plane, each moving along a straight line at an arbitrary constant speed. No two of their paths are parallel, and no three intersect at the same point. We know that traveller A has met travelers B, C, and D, and that traveller B has met C and D (and A). Show that C and D must also have met.

Solution

When a body travels at a constant speed, its graph with respect to time is a straight line. So, we add time axis in the third dimension, perpendicular to our plane. Naturally, the projection of each of these onto the plane corresponds to a road. Now, note that two intersecting lines define a plane and use the conditions in the problem to show that no two lines are parallel.