Results matter!

Rescuing a Castaway

Keywords: plane geometry, Pythagorean theorem, perpendicular bisector

A plane is searching the open sea for a castaway who has a device on their raft that emits a distress signal. The device has only a limited range. While flying over the sea, the crew picks up the signal, but after a short time, it is lost. The pilot turns the aircraft around, and they manage to receive the signal again, though only briefly.

The trajectory of the entire flight, including the direction of travel and the points where the signal was picked up (points A_1 a A_2) and lost (points B_1 and B_2) is shown on the map.
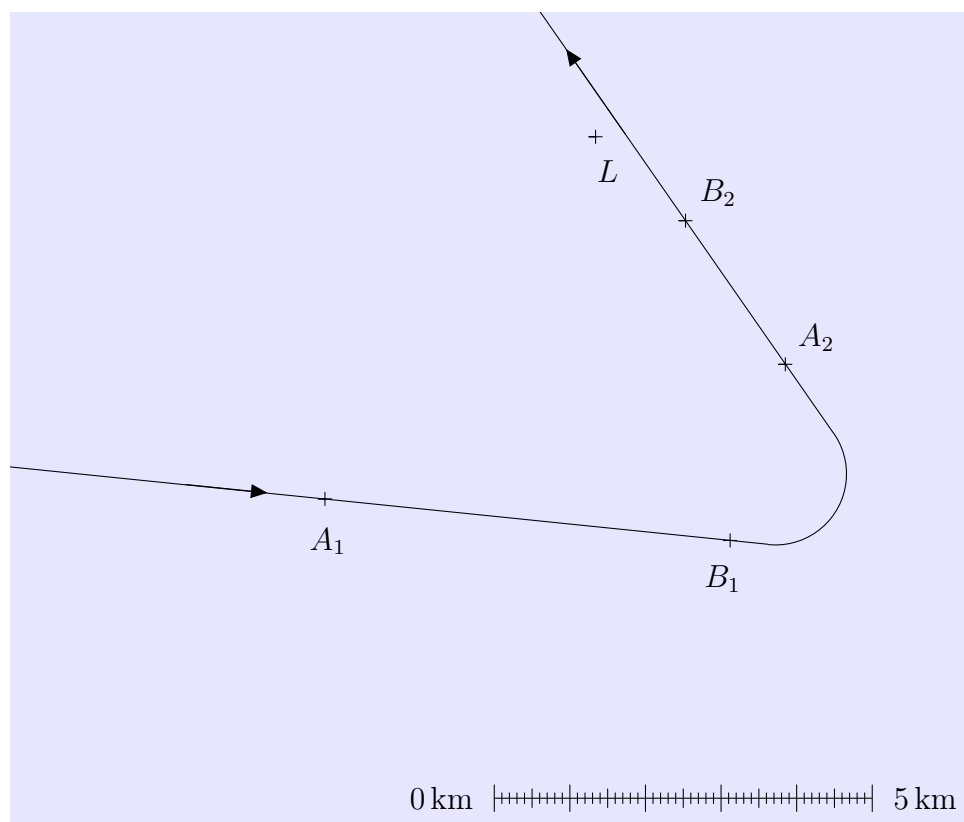

Figure 1: Flight trajectory of the aircraft

During both periods when the crew received the signal, the aircraft maintained a constant altitude. Between points B_1 and A_2, the aircraft descended by $500, \mathrm{m}$.

Exercise 1. Use a geometric construction on the map to determine the position X of the castaway.

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Exercise 2. There is a cargo ship in the area (position L). Can it also receive the castaway's distress signal, or is it too far away?

a) Transfer the lengths of segments LX, A_1X, and A_2X from the solution to Exercise 1 to the scale provided. Using these distances (rounded to the nearest smallest unit of the scale), solve the problem numerically.

b) Using the construction from Exercise 1, solve the problem again—this time relying solely on geometric constructions.