# Problems on motion

**№1.** Two motorcyclists departed simultaneously from cities A and B toward each other. After one hour they met and, without stopping, continued riding at the same speeds. One of them arrived in city A 35 minutes earlier than the other arrived in city B. Find the speed of each motorcyclist if the distance between the cities is 140 km.

**№2.** A freight train departed from station M to station N, the distance between which is 300 km. Forty minutes later, a fast train departed from station N to station M and met the freight train 2 hours after its own departure. The freight train covers the distance between stations M and N in 3 hours 20 minutes longer than the fast train. Find the speed of each train.

**№3.** A boat traveled along the river from pier A to pier B and returned back in 6 hours. Find the speed of the river current if the boat covers 2 km downstream in the same time as 1 km upstream, and the distance between piers A and B is 16 km.

**№4.** A motor ship traveled 100 km downstream and 64 km upstream in 9 hours. In the same amount of time, it could have traveled 80 km downstream and 80 km upstream. Find the speed of the ship in still water.

**№5.** A motor ship travels from point A to point B in 3 hours and returns back in 4 hours. How long will rafts take to float from point A to point B?

**№6.** From cities A and B, which are 40 km apart, Halyna and Kateryna simultaneously rode bicycles toward each other. Halyna arrived in city B 40 minutes after the meeting, and Kateryna arrived in city A 1.5 hours after the meeting. Find the speed of each girl.

**№7.** The distance between villages M and N is 36 km. A cyclist left village N, and after 0.5 hours another cyclist left village M toward him, whose speed is 6 km/h greater than that of the first. Find the speed of each cyclist if they met exactly at the midpoint between villages M and N.

**№9.** The distance between piers A and B is 28 km. Traveling upstream from pier A to pier B, a motorboat met a raft 2 hours after starting its journey. The raft had departed from pier B downstream 2 hours before the motorboat started. Find the speed of the river current and the speed of the motorboat in still water if the motorboat travels from A to B and back in 4 hours 48 minutes.

**№10.** A tourist traveled from point B to point A, which are 13 km apart, at a speed of 6 km/h. At the same time, another tourist left point A in a perpendicular direction at a speed of 4 km/h. After how much time from the start of their movement will the distance between the tourists be minimal?

**№11.** Three swimmers must swim from point A to point B and back. First, the first swimmer starts; 5 seconds later, the second starts; and another 5 seconds later, the third starts. All swimmers passed a point C, located between A and B, at the same time while swimming toward B. The third swimmer, after reaching B and swimming back, met the second swimmer 9 m from B and the first swimmer 15 m from B. Find the speed of the third swimmer if the distance AB is 55 m.

**№12.** A pedestrian left point A toward point B. Two hours later, a cyclist departed from point A after him, and another 30 minutes later a motorcyclist departed. A few minutes after the motorcyclist started, it turned out that by that moment all three had covered the same part of the distance from A to B. The pedestrian arrived at point B 1 hour later than the motorcyclist. How many minutes earlier than the pedestrian did the cyclist arrive at point B?