

## MOTION PROBLEMS

1. Natty Bumppo swims straight across a lake at the rate of 25 meters per minute to a spot where he has left his canoe. He then paddles back to his starting point along a straight course at the rate of 75 meters per minute. If the round trip takes an hour and 20 minutes, how far is it from shore to shore?
2. How long will it take you to walk to class if you walk 3 kilometers per hour along a straight path, and the classroom is a kilometer and a half from where you are?
3. An automobile headed westward travels for 2 hours at 70 km/h. It then slows down and continues westward at 60 km/h for the next hour and a quarter. How far does it travel?
4. Two cars leave the center of town at the same time traveling in opposite directions. One car is going 48 km/h; the other is going 62 km/h. How far apart are they after 6 hours?
5. Two bicyclists leave the same place at the same time traveling in the same direction along a straight road. One goes at 18 km/h, the other at 14 km/h. How far apart are they after an hour and a quarter?
6. A rowboat goes upstream at the rate of 4 kilometers per hour. It returns downstream at the rate of 8 kilometers per hour. If the round trip takes 3 hours, how far upstream did it go?
7. A skier walks 3000 meters up a mountain road, rests for 10 minutes, and then skis down the road. He returns a half hour after he started. If he skis four times as fast as he walks, at what rate does he ski?

8. A cross country runner can average 10 kilometers per hour over level ground and 6 kilometers per hour over hilly ground. Altogether it takes him an hour and forty minutes to cover 12 miles. How many of these kilometers are hilly?

9. A canoeist paddles at a constant rate. He finds that it takes him 2 hours longer to make a 12 kilometer trip upstream than it does downstream. If the current is 3 kilometers per hour, how long would the trip take in still water?

10. Two cars, each traveling at a constant rate, leave Boston headed for Philadelphia, 300 kilometers away. One car travels 10 kilometers per hour faster and arrives 1 hour earlier than the other car. Determine the rate of the faster car.

11. A college rowing team can row 2 kilometers downstream in 8 minutes, and it takes 12 minutes for the team to row the same distance upstream. How fast can the team row in still water, and what is the rate of the current?

12. Two cars approach one another along a straight highway. They start out at the same time from points 195 kilometers apart. One travels at the rate of 70 kilometers per hour and the other at a rate of 60 kilometers per hour. How far has the slower car gone when they pass each other?

13. A canoeist goes upstream at the rate of 8 kilometers per hour. He returns downstream at the rate of 12 kilometers per hour. If the round trip takes 5 hours, how far upstream did he go?

14. A college rowing team that can row 12 kilometers per hour in still water rowed a distance of 6 kilometers downstream. If the rate of the current had been double its actual rate, the team would have covered the distance in 4 minutes less time. Find the actual rate of the current.

15. A boy can row 8 kilometers downstream and return a distance of 8 kilometers upstream in 5 hours. If the rate of the current is 3 kilometers per hour, what is the boy's rate of rowing in still water?

16. A man travels by automobile a distance of 125 kilometers at his customary average speed. If his average speed had been 10 kilometers per hour less, he would have taken 25 minutes longer to travel the same distance. What is his customary average speed?

17. A father and daughter leave home at the same time in separate automobiles. The father drives to his office, a distance of 12 kilometers, and the daughter drives a distance of 14 kilometers to school. If they arrive at their destinations at the same time, find their average speeds if the daughter's average speed is 6 kilometers per hour more than her father's.

18. In an automobile race, the speed of one car was 120 kilometers per hour and the speed of another car was 105 kilometers per hour. If the faster car finished the race 20 minutes before the slower car, what was the distance of the race?

19. Two hikers leave town A at the same time and walk by two different routes to town B. The average speed of one hiker is 1 kilometer per hour more than the average speed of the other hiker. The slower hiker reaches town B  $\frac{1}{2}$  hour before the faster hiker, because the route taken by the faster hiker is 15 kilometers long, while the route taken by the slower hiker is only 10 kilometers long. What is the average speed of each hiker?

20. A man leaves home at 8:00 am and walks to his office at the rate of 4 kilometers per hour. At 8:15 am, the man's son leaves home and rides his bicycle at a rate of 10 kilometers per hour along the same route to school. At what time does the son overtake the father?