

Distance, Rate, and Time Problems

Set 1

1. A boy walks 2 miles per hour. How far will he walk in 3 hours? in x hours? in y hours? in $x + 3$ hours? in $y - 2$ hours? in $x + y$ hours?
2. A travels x miles per hour. B travels 5 miles per hour less. What is B's rate? How far does A travel in 5 hours? How far does B travel in 5 hours? What is the sum of the distances traveled by A and B in 5 hours?
3. A man travels at the rate of x miles per hour. How long will it take him to travel 100 miles? 50 miles? y miles?
4. A man travels for 3 hours. At what rate must he travel to cover 30 miles? 150 miles? x miles? y miles? $x + 2$ miles?
5. If a man's rate of rowing in still water is S miles an hour and the current flows at the rate of C miles an hour, express the man's rate (a) when rowing with the current, (b) when rowing against the current.
6. An airplane can go 120 miles an hour in the calm. How fast can it go against a wind blowing x miles an hour? with the wind?
7. A is 60 miles from B. An automobile at A starts for B at the rate of 20 miles an hour at the same time that an automobile at B starts for A at the rate of 25 miles an hour. How long will it be before the automobiles meet?
8. Two automobiles are 276 miles apart and start at the same time to travel toward each other. They travel at rates differing by 5 miles per hour. If they meet after 6 hours, find the rate of each.
9. Two trains travel toward each other from points which are 195 miles apart. They travel at rates of 25 and 40 miles an hour respectively. If they start at the same time, how soon will they meet?
10. A and B start toward each other at the same time from points 150 miles apart. If A went at the rate of 20 miles an hour, at what rate must B travel if they meet in 5 hours?
11. A passenger and a freight train start toward each other at the same time from two points 300 miles apart. If the rate of the passenger train exceeds that rate of the freight train by 15 miles per hour, and they meet after 4 hours, what must the rate of each be?
12. Two automobiles started at the same time from the same point, but traveled in opposite directions. Their rates were 25 and 35 miles per hour respectively. After how many hours were they 180 miles apart?

13. Two men traveling in opposite directions at the rates of 20 and 30 miles an hour at the same time and from the same place. In how many hours will they be 300 miles apart?
14. Two men start at the same time from the same place and travel in opposite directions; the ratio of their rates is 2:3. In 5 hours they are 100 miles apart. Find the rate of each.
15. Two automobiles starting from Albany travel east and west respectively, the first one traveling $\frac{3}{4}$ as fast as the second. In 6 hours they are 378 miles apart. Find the rate of each.
16. Two automobiles starting from Chicago travel east and west respectively. The first one travels $\frac{1}{3}$ as fast as the second, and in 5 hours they are 340 miles apart. Find the rate of each.
17. Two trains start at the same time from the same place and travel in opposite directions. If the rate of one is 6 miles per hour more than the rate of the other and they are 168 miles apart at the end of 4 hours, what is the rate of each?
18. Two men start at the same time and travel in opposite directions. The ratio of their rates is 3:4. In 6 hours they are 126 miles apart. Find the rate of each.
19. An automobile is traveling at the rate of 20 miles per hour; at what rate must a second automobile travel which starts 2 hours after the first and wishes to overtake it in 4 hours?
20. A, who travels 4 miles an hour starts from a certain place 2 hours in advance of B, who travels 5 miles an hour in the same directions. How many hours must B travel to overtake A?
21. A man starts from a certain place and walks at the rate of $3\frac{1}{2}$ miles an hour; two and a half hours later another man starts from the same place and rides in the same direction at the rate of $8\frac{1}{2}$ miles an hour. In how many hours will the second man overtake the first?
22. A man travels 5 miles an hour. After traveling for 6 hours another man starts at the same place, following at the rate of 8 miles an hour. When will the second man overtake the first?
23. A man travels at the rate of 5 miles an hour. After he has traveled for 6 hours an automobile starts from the same place and overtakes him in 4 hours. What was the rate of the automobile?

24. A man having ten hours at his disposal made an excursion, riding out at the rate of 10 miles an hour and returning on foot, at the rate of 3 miles an hour. Find the distance he rode.
25. A man walks at the rate of 4 miles per hour. How far can he walk into the country and ride back on a trolley that travels at the rate of 20 miles per hour, if he must be back home 3 hours from the time he started?
26. A boy rides away from home in an automobile at the rate of 28 miles an hour and walks back at the rate of 4 miles an hour. The round trip requires 2 hours. How far does he ride?
27. A motorcycle breaks down and the rider has to walk the rest of the way to work. The motorcycle was being driven at 45 mph, and the rider walks at a speed of 6 mph. The distance from home to work is 25 miles, and the total time for the trip was 2 hours. How far did the motorcycle go before it broke down?
28. A student walks and jogs to college each day. The student averages 5 km/hr walking and 9 km/hr jogging. The distance from home to college is 8 km, and the student makes the trip in one hour. How far does the student jog?
29. Two cyclists start from the same point and ride in opposite directions. One cyclist rides twice as fast as the other. In three hours they are 72 miles apart. Find the rate of each cyclist.
30. Two small planes start from the same point and fly in opposite directions. The first plane is flying 25 mph slower than the second plane. In two hours the planes are 430 miles apart. Find the rate of each plane.
31. A motorboat leaves a harbor and travels at an average speed of 8mph toward a small island. Two hours later a cabin cruiser leaves the same harbor and travels at an average speed of 16 mph toward the same island. In how many hours after the cabin cruiser leaves will the cabin cruiser be alongside the motorboat?
32. A long distance runner started on a course running at an average speed of 6 mph. One hour later, a second runner began the same course at an average speed of 8 mph. How long after the second runner started will the second runner overtake the first runner?
33. A motorboat leaves a harbor and travels at an average speed of 15 mph toward an island. The average speed on the return trip was 10 mph. How far was the island from the harbor if the total trip took 5 hours?

34. On a 105 mile trip, a car traveled at an average speed of 45 mph for part of the trip and then reduced the speed to 30 mph for the remainder of the trip. The trip took a total of $2\frac{1}{2}$ hours. For how long did the car travel at 30 mph?
35. A family drove to a resort at an average speed of 30 mph and later returned over the same road at an average speed of 50 mph. Find the distance to the resort if the total driving time was 8 hours?
36. As part of his flight training, a student pilot was required to fly to an airport and then return. The average speed to the airport was 90 mph, and the average speed returning was 120 mph. Find the distance between the two airports if the total flying time was 7 hours.
37. Running at an average rate of 8 m/s, a sprinter ran to the end of a track and then jogged back to the starting point at an average rate of 3 m/s. The sprinter took 55 s to run to the end of the track and jog back. Find the length of the track.
38. A car travelling at 48 mph overtakes a cyclist who, riding at 12 mph, has had a 3 hour head start. How far from the starting point does the car overtake the cyclist?
39. A jet plane traveling at 600 mph overtakes a propeller-driven plane which has had a 2 hour head start. The propeller-driven plane is traveling at 200 mph. How far from the starting point does the jet overtake the propeller-driven plane?
40. Two trains 140 miles apart are approaching each other, and they will meet in 2 hours. If both were running in the same direction it would be 14 hours before the faster train would overtake the other. What is the rate of each train?

Set 2

1. Two small planes start from the same point and fly in opposite directions. The first plane is flying 25 mph slower than the second plane. In 2 h, the planes are 470 mi apart. Find the rate of each plane.
2. Two cyclists start from the same point and ride in opposite directions. One cyclist rides twice as fast as the other. In 3 h, they are 81 mi apart. Find the rate of each cyclist.
3. A long-distance runner started on a course running at an average speed of 6 mph. One half-hour later, a second runner began the same course at an average speed of 7 mph. How long after the second runner started will the second runner overtake the first runner?

4. A motorboat leaves a harbor and travels at an average speed of 9 mph toward a small island. Two hours later a cabin cruiser leaves the same harbor and travels at an average speed of 18 mph toward the same island. In how many hours after the cabin cruiser leaves will the cabin cruiser be alongside the motorboat?
5. On a 130 mi trip, a car traveled at an average speed of 55 mph and then reduced its speed to 40 mph for the remainder of the trip. The trip took a total of 2.5 h. For how long did the car travel at 40 mph?
6. A motorboat leaves a harbor and travels at an average speed of 18 mph to an island. The average speed on the return trip was 12 mph. How far was the island from the harbor if the total trip took 5 h?
7. As part of flight training, a student pilot was required to fly to an airport and then return. The average speed on the way to the airport was 100 mph, and the average speed returning was 150 mph. Find the distance between the two air ports if the total flight time was 5 h.
8. A family drove to a resort at an average speed of 25 mph and later returned over the same road at an average speed of 40 mph. Find the distance to the resort if the total driving time was 13 h.
9. Three campers left their campsite by canoe and paddled downstream at an average rate of 10 mph. They then turned around and paddled back upstream at an average rate of 5 mph to return to their campsite. How long did it take the campers to canoe downstream if the total trip took 1 h?
10. Running at an average rate of 8 m/s, a sprinter ran to the end of a track and then jogged back to the starting point at an average rate of 6 m/s. The sprinter took 35 s to run to the end of the track and jog back. Find the length of the track.
11. A jet plane traveling at 570 mph overtakes a propeller-driven plane that has had a 2 h head start. The propeller-driven plane is traveling at 190 mph. How far from the starting point does the jet overtake the propeller-driven plane?
12. A car traveling at 56 mph overtakes a cyclist who, riding at 14 mph, has had a 3 h head start. How far from the starting point does the car overtake the cyclist?
13. A 605 mi, 5 h plane trip was flown at two speeds. For the first part of the trip, the average speed was 115 mph. For the remainder of the trip, the average speed was 125 mph. How long did the plane fly at each speed?
14. On a 220 mi trip, a car traveled at an average speed of 50 mph and then reduced its average speed to 35 mph for the remainder of the trip. The trip took a total of 5 h. How long did the car travel at each speed?

15. After a sailboat had been on the water for 3 h, a change in wind direction reduced the average speed of the boat by 5 mph. The entire distance sailed was 51 mi. The total time spent sailing was 6 h. How far did the sailboat travel in the first 3 h?
16. A bus traveled on a level road for 2 h at an average speed that was 20 mph faster than its average speed on a winding road. The time spent on the winding road was 3 h. Find the average speed on the winding road if the total trip was 210 mi.
17. A passenger train leaves a train depot 1 h after a freight train leaves the same depot. The freight train is traveling 15 mph slower than the passenger train. Find the rate of each train if the passenger train overtakes the freight train in 3 h.
18. An executive drove from home at an average speed of 40 mph to an airport where a helicopter was waiting. The executive boarded the helicopter and flew to the corporate offices at an average speed of 60 mph. The entire distance was 150 mi. The entire trip took 3 h. Find the distance from the airport to the corporate offices.
19. A bus traveling at a rate of 60 mph overtakes a car traveling at a rate of 45 mph. If the car had a 1 h head start, how far from the starting point does the bus overtake the car?
20. A car and a cyclist start at 10 A.M. from the same point, headed in the same direction. The average speed of the car is 5 mph more than three times the average speed of the cyclist. In 1.5 h, the car is 46.5 mi ahead of the cyclist. Find the rate of the cyclist .
21. A cyclist and a jogger set out at 11 A.M. from the same point, headed in the same direction. The average speed of the cyclist is twice the average speed of the jogger. In 1 h, the cyclist is 7 mi ahead of the jogger. Find the rate of the cyclist.
22. A car and a bus set out at 2 P.M. from the same point, headed in the same direction. The average speed of the car is 30 mph slower than twice the average speed of the bus. In 2 h, the car is 30 mi ahead of the bus. Find the rate of the car.
23. Two joggers start at the same time from opposite ends of a 12 mi course. One jogger is running at a rate of 5 mph, and the other is running at a rate of 7 mph. How long after they begin will they meet?
24. Two cyclists start at the same time from opposite ends of a course that is 51 mi long. One cyclist is riding at a rate of 16 mph, and the second cyclist is riding at a rate of 18 mph. How long after they begin will they meet?
25. At 10 A.M., two campers left their campsite by canoe and paddled downstream at an average speed of 12 mph. They then turned around and paddled back upstream at an average rate of 4 mph. The total trip took 1 h. At what time did the campers turn around downstream?

26. At 7 A.M., two joggers start from opposite ends of an 8 mi course. One jogger is running at a rate of 4 mph, and the other is running at a rate of 6 mph. At what time will the joggers meet?
27. A truck leaves a depot at 11 A.M. and travels at a speed of 45 mph. At noon, a van leaves the same place and travels the same route at a speed of 65 mph. At what time does the van overtake the truck?
28. A hare and a tortoise are racing between two trees 150 feet apart. The tortoise has a headstart of 30 seconds, but the hare catches up in 5 seconds. The hare then runs all the way to the finish line, turns around, and runs back to meet the tortoise again 10 seconds later (the hare has now run a total of 15 seconds). What is the speed of each, assuming that they remain constant throughout the race?

Answers

Set 1

- 6 mi, $2x$, $2y$, $2x + 6$, $2y - 4$, $2x + 2y$
- $x - 5$, $5x$, $5x - 25$, $10x - 25$
- $\frac{100}{x}$, $\frac{50}{x}$, $\frac{y}{x}$
- $10\frac{\text{mi}}{\text{h}}$, $50\frac{\text{mi}}{\text{h}}$, $\frac{x}{3}$, $\frac{y}{3}$, $\frac{x+2}{3}$
- (a) $S + C$, (b) $S - C$
- $120 - x$, $120 + x$
- $1\frac{1}{3}\text{h}$
- $25\frac{1}{2}\text{h}$, $20\frac{1}{2}\text{h}$
- 3
- $10\frac{\text{mi}}{\text{h}}$
- 30, 45
- 3 h
- 6 h
- $8\frac{\text{mi}}{\text{h}}$, $12\frac{\text{mi}}{\text{h}}$
- 36, 27
- $17\frac{\text{mi}}{\text{h}}$, $51\frac{\text{mi}}{\text{h}}$
- 24, 18
- $9\frac{\text{mi}}{\text{h}}$, $12\frac{\text{mi}}{\text{h}}$
- 30
- 8 h
- 1.75
- 10 h
- 12.5
- $\frac{300}{13}\text{mi}$
- 10
- 7 mi
- 15
- $\frac{27}{4}\text{km}$
- $8\frac{\text{mi}}{\text{h}}$, $16\frac{\text{mi}}{\text{h}}$
- $95\frac{\text{mi}}{\text{h}}$, $120\frac{\text{mi}}{\text{h}}$
- 2 h
- 3 h
- 30 mi
- $\frac{1}{2}\text{h}$
- 150 mi
- 360 mi
- 120 m
- 48 mi
- 600 mi
- 30, 40

Set 2

- 105, 130
- 9, 18
- 3
- 2
- $\frac{1}{2}$
- 36
- 300
- 200
- $\frac{1}{3}$
- 120
- 570
- 56
- 2@115, 3@125
- 3@50, 2@35
- 33
- 34
- 60, 45
- 90
- 180
- 20
- 14
- 60
- 23
- 1
- 24
- 10:15 AM
- 26
- 7:48 AM
- 24
- 1.5
- $14\frac{\text{ft}}{\text{s}}$, $2\frac{\text{ft}}{\text{s}}$
- 27
- 2:15 PM