

## 8.6 D=R\*T Applications

Name: \_\_\_\_\_

**NOTES**

Write your  
questions here!



### Distance Introduction

When traveling a certain distance, it is done at a certain speed (rate) for a certain length of time. The formula that ties these variables together is...

$$\text{Distance} = \text{rate} * \text{time}$$

There will be three types of problems that we can solve that involve uniform motion.'

- 1- Motion in opposite directions
- 2- Motion in the same direction
- 3- Round trip

We will use charts to help us organize what we know and to guide us in setting up equations!

### Two Moving Objects

Sometimes two objects travel to cover a certain distance. They either travel toward or away from each other, yet the combined distance is of importance.

To solve these types of problems, we should make a diagram to aid us in understanding what is happening. Here are two examples.

Example 1: "Two skateboarders, Ron and Bob, are traveling in opposite directions. Ron travels at 8 feet per second and Bob travels at 10 feet per second. How long will it take before they are 2640 feet (1/2 mile) apart?"

Picture:

Distance Rate Time Chart.

	Rate	Time	Distance
Skateboarder 1			
Skateboarder 2			
<i>Total:</i>			

Write your questions here!



Example 2: "Two friends, Sherry and Fredrick, live 2000 miles apart. They want to meet each other and decided to both travel so that they can see each other sooner. If they both drive directly toward each other and Sherry travels at 50 mph and Fredrick travels at 60 mph, how much time will pass before they meet each other?"

Picture:

Distance Rate Time Chart.

	Rate	Time	Distance
Sherry			
Fredrick			
<i>Total:</i>			

## The Chase

Example 1: "A helicopter travels to the East going 120 mph. Two hours later, it is determined that the helicopter will need to be escorted on its journey to the East. How long will it take an F-14, traveling at 900 mph to catch up with the helicopter?"

Picture:

	Rate	Time	Distance
Helicopter			
F-14			

**Totals:**

Write your questions here!



Example 2:

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?

Picture:

	Rate	Time	Distance
1st part			
2nd part			
	Totals:		

Example 3:

A ski lift carried Maria up a slope at a rate of 6 km/h, and she skied back down parallel to the ski lift at 34 km/h. The round trip took 30 minutes. How far did she ski and for how long?

Picture:

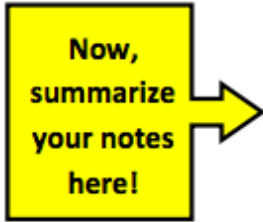
	Rate	Time	Distance
Juan			
Maria			

**Totals:**

**Example 4:** Into a headwind, the plane flew 2000 miles in 5 hours. With a tailwind, the return trip took 4 hours. Find the speed of the plane in still air and the speed of the wind.

	Rate	Time	Distance
Headwind			
Tailwind			
	Totals:		

## SUMMARY:



### PROBLEM SET

Solve the "*Distance = Rate x Time*" problems by setting up a table.

1. Bob and Fred start from the same point and walk in opposite directions. Bob walks 2 miles per hour faster than Fred. After 3 hours they are 30 miles apart. How fast did each walk?

	Rate	Time	Distance
Bob		3	
Fred		3	

Picture

2. Two campers left their campsite by canoe and paddled downstream at an average speed of 12 mph. They turned around and paddled back upstream at an average rate of 4 mph. The total trip took 60 minutes. After how much time did the campers turn around downstream?

	Rate	Time	Distance
Down	12		
Up	4		

Picture

3. Mike leaves his house traveling 2 miles per hour. Joy leaves 6 hours later to catch up with him traveling 8 miles per hour. How long will it take her to catch up with him?

	Rate	Time	Distance
Mike	2		
Joy	8		

Picture

4. On a 130 mile 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 2.5 hours. For how long did the car travel 40 mph?

	Rate	Time	Distance
Fast	55		
Slow	40		

Picture

5. An airplane can fly 550 miles with the wind in the same amount of time it takes to fly 425 miles against the wind. Find the speed of the wind, if the airplane is flying at a constant speed of 195 miles per hour.

	Rate	Time	Distance
With Wind		t	550
Against the Wind		t	425

### **Distance, Rate, Time Problems**

(Setup the table yourself)

6. 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 the rate of the freight train by 15 miles per hour, and they meet after 4 hours, what must the rate of each be?

7. 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?

8. A motorboat leaves a harbor and travels at an average speed of 8 mph 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?

9. A train leaves Deb's house and travels at 50 miles per hour. Two hours later, another train leaves from Deb's house on the track beside or parallel to the first train but it travels at 100 miles per hour.

How far away from Deb's house will the faster train pass the other train?

10. 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 hour head start, how far from the starting point does the bus overtake the car?

11. 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.

12. Mike's boat goes 12 miles per hour in still water. Find the rate of the current of the river if he can go 21 miles downstream in the same amount of time he can go 15 miles upstream.

13. 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?

14. Tracey ran to the top of a steep hill at an average pace of 6 miles per hour. She took the exact same trail back down. To her relief, the descent was much faster; her average speed rose to 14 miles per hour. If the entire run took Tracey exactly one hour to complete and she did not make any stops, what is the length of trail in miles one way?

15. A man bikes at a rate that is 6 miles/hour faster than the rate at which he jogs. After 30 minutes jogging and 90 minutes biking, the man has covered 21 miles. Over what distance was the man jogging?



16. A boat can go 15 miles against a current in the same time that it can go 25 miles with the current. The current is 4 miles per hour. Find the speed of the boat in still water.

17. With the wind, an airplane travels 1120 miles in seven hours. Against the wind, it takes eight hours. Find the rate of the plane in still air and the velocity of the wind.

18. A submarine traveled to St. Vincent and back. It took three hours less time to get there than it did to get back. The average speed on the trip there was 30 km/h. The average speed on the way back was 20 km/h. How many hours did the trip take?

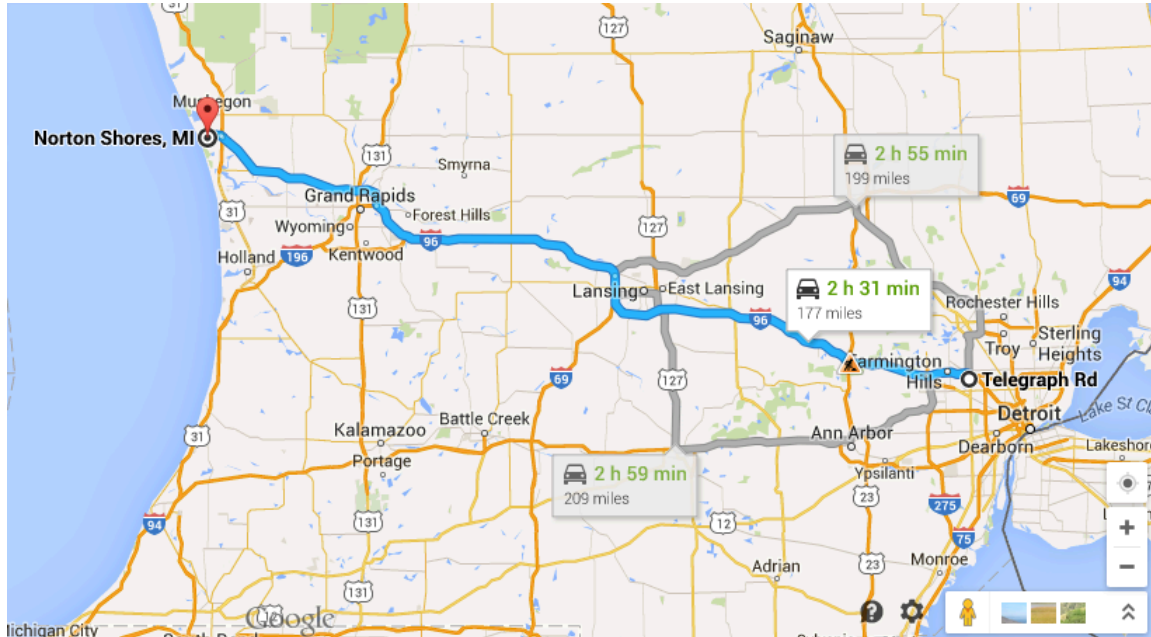
19. A 555 mile trip, 5-hour trip on the Autobahn was driven at two speeds. The average speed of the car was 105 mph on the first part of the trip, and the average speed of the car was 115 mph for the second part of the trip. How long did the car travel at each speed?

20. A passenger train travels at 80 mph. A freight train travels at 30 mph. If they travel in opposite directions. How long will it take before they are 275 miles apart?

21. A boat can go 10 miles upstream in 30 minutes. The return downstream takes only 20 minutes. What is the speed of the boat in still water and the speed of the current?

22. **Real world scenario** – Zacho lives in Northon Shores and gets off work at 5:00pm. Molly lives in Farmington and gets off work at 3:30pm. What time and where should the two meet for dinner?

	Rate	Time	Distance
Molly	65 mi/hr		
Zacho	80 mi/hr		



23. Write your own “ $D=R*T$ ” problem and solve it. Staple your work to the back of the packet.

24. An airplane flying into a head wind travels the 1800-mile flying distance between two cities in 3 hours and 36 minutes. On the return flight, the same distance is traveled in 3 hours. Find the ground speed of the plane and the speed of the wind, assuming that both remain constant. [Ground speed is the speed of the plane if there were no wind.]

25. On the first part of her trip Natalie road her bike 16 miles and on the second part of her trip she road her bike 42 miles. Her average speed during the second part of the trip was 6 miles per hour faster than her average speed on the first part of the trip. Find her average speed for the second part of the trip if the total time for the trip was 5 hours.