

**Examples**

1. A hiker averages 1.4 mph when walking downhill on a mountain trail and 0.8 mph on the return trip when walking uphill. What is the hiker's average speed for the entire trip? Round to the nearest hundredth.
2. Justin's average speed on his way to school is 40 mph, and his average speed on the way home is 45 mph. What is Justin's average speed for the entire trip? Round to the nearest hundredth.
3. A solution is heated from  $0^{\circ}\text{C}$  to  $100^{\circ}\text{C}$ . Between  $0^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ , the rate of temperature increase is  $1.5^{\circ}\text{C}/\text{min}$ . Between  $50^{\circ}$  and  $100^{\circ}\text{C}$ , the rate of temperature increase is  $0.4^{\circ}\text{C}/\text{min}$ . What is the average rate of temperature increase during the entire heating process? Round to the nearest hundredth.
4. Natalie can finish a 500-piece puzzle in about 8 hours. When Natalie and Renzo work together, they can finish a 500-piece puzzle in about 4.5 hours. About how long will it take Renzo to finish a 500-piece puzzle if he works by himself?
5. Julien can mulch a garden in 20 minutes. Together Julien and Remy can mulch the same garden in 11 minutes. How long will it take Remy to mulch the garden when working alone?
6. A jet travels 3950 miles from Chicago, Illinois, to London, England, and 3950 miles on the return trip. The total flying time is 16.5 hours. The return trip takes longer due to winds that generally blow from west to east. If the jet's average speed with no wind is 485 mph, what is the average speed of the wind during the round-trip flight? Round to the nearest mph.
7. On a river, a kayaker travels 2 miles upstream and 2 miles downstream in a total of 5 hours. In still water, the kayaker can travel at an average speed of 2 mph. Based on this information, what is the average speed of the current of this river? Round to the nearest tenth.
8. A boat, which moves at 36 mph, travels 28 miles downstream in the same amount of time that it takes to travel 20 miles upstream. Find the speed of the current.

9. Jason and Hilger are required to paint over the graffiti on a wall. If Jason worked alone, it would take him 20 hours to repaint. Working alone, Hilger could do the job in 15 hours. How long will it take them to do the painting if they work together?
10. Gilbert took 2 hours longer to drive 240 miles on the first day of a business trip than to drive 144 miles on the second day. If his rate was the same both days, what was his driving time for each day?
11. An experienced roofer can work twice as fast as her helper. Working together, they can shingle a new section of roof in 4 hours. How long would it take the experienced roofer, working alone, to complete the same job.
12. The sum of the reciprocals of two consecutive integers is equal to 11 times the reciprocal of the product of those integers. What are the two integers?
13. If the same number is added to the numerator and denominator of  $\frac{2}{5}$ , the result is  $\frac{4}{5}$ . What is that number?

**Homework – Write an equation to model each situation. Solve the equation to answer each question. All work must be done on separate paper.**

1. A boat, which moves at 30 mph in still water, travels 3 miles downstream in the same amount of time that it takes to travel 2 miles upstream. Find the speed of the current.
2. Filling a hot tub with a hose will take 4 hours. Draining the same tub takes 7 hours. If the drain is open, how long will it take to fill the tub? (Hint: Treat the draining time as a negative number.)
3. Polly can bicycle 75 miles in the same time it takes her to drive 165 miles. If her driving rate is 30 mph faster than her rate on the bicycle, find each rate.
4. A plane flew 720 miles with a steady 30 mph tailwind. The pilot then returned to the starting point, flying against the same wind. If the round-trip flight took 10 hours, what was the plane's airspeed?
5. Janet and Michael took a canoeing trip, traveling 6 miles upstream along a river, against a 2 mph current. They then returned downstream to the starting point of their trip. If their entire trip took 4 hours, what was their rate in still water?
6. A light plane took 1 hour longer to fly 540 miles on the first portion of a trip than to fly 360 miles on the second. If the rate was the same for each portion, what was the flying time for each leg of the trip?
7. An express train and a passenger bus leave the same city, at the same time, for a destination 350 miles away. The rate of the train is 20 mph faster than the rate of the bus. If the train arrives at its destination 2 hours ahead of the bus, find each rate.
8. One road crew can pave a section of highway in 15 hours. A second crew, working with newer equipment, can do the same job in 10 hours. How long would it take to pave the same section of highway if both crews worked together?
9. An electrician can wire a house in 20 hours. If she works with an apprentice, the same job can be completed in 12 hours. How long would it take the apprentice, working alone, to wire the house?
10. A college uses two optical scanners to grade multiple-choice tests. One model takes 12 minutes longer to complete the scoring of a test than the other model. If by both models working together the test can be scored in 8 minutes, how long would each model take to score the same test, used by itself?
11. The sum of the reciprocals of two consecutive even integers is 10 times the reciprocal of the product of those integers. Find the two integers.
12. If the same number is subtracted from the numerator and denominator of  $\frac{11}{15}$ , the result is  $\frac{1}{3}$ . Find that number.