
 NAME _____

Module 16 Solving Rational Equations
Lesson 4 Solving Various Types of Problems
 Using Rational Equations



**independent
practice**

Solve.

1. A painter can paint a room's trim in 60 minutes. His apprentice requires 90 minutes to complete the same job. Working together, how long will it take the painter and his apprentice to paint the room's trim?

36 minutes

2. An experienced bricklayer can build a small patio in 10 hours. A novice can build the same patio in 15 hours. Working together, how long will it take the experienced and novice bricklayers to build the patio?

6 hours

3. When two valves are opened, a pool can be drained in 3 hours. The larger of the two valves can drain the pool in 5 hours. If only the smaller valve is opened, how long will it take to drain the pool?

$7\frac{1}{2}$ hours or 7 hours 30 minutes

4. An experienced data entry clerk can record a file in 20 minutes. Another clerk requires 30 minutes to do the same job. If the two worked together, how long would it take them to complete the job?

12 minutes

5. An airplane flew at an average speed that was 500 miles per hour greater than that of a helicopter. In the same time, the airplane flew 1,800 miles, and the helicopter flew 300 miles. What was the average speed of each aircraft?

Airplane: 600 miles per hour; Helicopter: 100 miles per hour

6. A saleswoman drove 165 miles and then, flew 660 miles. The average rate of speed of the plane was 4 times that of the car. If the total amount of time spent traveling was 6 hours, what was the rate of speed of the plane?

220 miles per hour

Journal

- Two cars are traveling at the same rate. Car A travels for five hours and travels 50 more miles than Car B. Car B travels for four hours. Write and solve an equation to determine the rate of the two cars.
- In a uniform motion problem, explain how to find the expression for time.
- In a uniform motion problem, explain how you know whether to add the expressions for time or set them equal.
- Ben can mow the yard in 40 minutes. Chris can mow the same yard in 20 minutes. Explain why the average of the two times, 30 minutes, is not the correct time it will take for the two to cut the grass together.
- A carpenter can build a tree house in two days. Explain why his rate of work is $\frac{1}{2}$. What is the unit of measurement for the rate $\frac{1}{2}$?

Cumulative Review

Simplify.

- | | | | |
|---|--|--|-------------------------------|
| 1. $\sqrt{121}$
<u>11</u> | 2. $\sqrt{49}$
<u>7</u> | 3. $\sqrt{25}$
<u>5</u> | 4. $\sqrt{169}$
<u>13</u> |
| 5. $\sqrt{196}$
<u>14</u> | 6. $\sqrt{400}$
<u>20</u> | 7. $\sqrt{1} \cdot \sqrt{9}$
<u>3</u> | 8. $-2\sqrt{16}$
<u>-8</u> |
| 9. $4\sqrt{25} + 3\sqrt{81}$
<u>47</u> | 10. $(\sqrt{36})^2 \div 9$
<u>4</u> | | |

Possible Journal Answers

- Equate the expressions for rate and solve the equation $\frac{d+50}{5} = \frac{d}{4}$. Here, $d = 800$; so, $r = \frac{800}{4} = 50$. The cars travel at 50 miles per hour.
- The formula $t = d \div r$ is used to find an expression for time. This is derived from the uniform motion equation $d = rt$. By the Division Property of Equality, $t = d \div r$.
- If you can form two expressions that equal the same constant, then, the expression should be set equal. For example, if there are two expressions that equal the same time in a uniform motion problem, set these two expressions equal to each other. If two or more expressions are part of a sum, add these expressions together. For example, if the rate of two workers and the total time it would take for them to complete the job is known, then, the sum of the work rate times time expressions equal the total time for the completion of the project.
- If Chris can mow the yard in 20 minutes, together they will be able to mow the yard in less than 20 minutes.
- Because it takes two days to complete one tree house, the carpenter can complete half a tree house in one day. His rate of work is $\frac{1}{2}$ tree house per day.