

## Example Preview

If Sarah were to paint her living room alone, it would take 5 hours. Her sister Rachel could do the job in 8 hours. How many hours would it take them working together?

### Solution

The rate of work for Sarah is  $\frac{1}{5}$ , while the rate of work for her sister Rachel is  $\frac{1}{8}$ . If we let  $x$  denote the time needed to paint the living room when both sisters are working together, the sum of the two individual rates must equal  $\frac{1}{x}$ . So, we need to solve the equation  $\frac{1}{5} + \frac{1}{8} = \frac{1}{x}$ . In this case, the LCD is  $40x$ .

The equation can be solved as follows.

$$\begin{aligned} 40x \cdot \frac{1}{5} + 40x \cdot \frac{1}{8} &= 40x \cdot \frac{1}{x} \\ 8x + 5x &= 40 \\ 13x &= 40 \\ x &= \frac{40}{13} \end{aligned}$$

It would take them  $\frac{40}{13}$ , or a little over 3 hours to paint the living room together.

## 1.R.2 Exercises

### Concept Check

**True/False.** Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- To find  $\frac{1}{2}$  of  $\frac{2}{9}$  requires multiplication.
- $\frac{3}{4} \cdot \frac{9}{10} = \frac{27}{40}$
- The statement  $\frac{1}{3} \cdot \frac{2}{5} = \frac{2}{5} \cdot \frac{1}{3}$  is an example of the associative property of multiplication.
- The product of a nonzero number and its reciprocal is undefined.

5. The reciprocal of 1 is undefined.

6. The result of  $\frac{1}{3} \div \frac{1}{6}$  is 2.

7. The reciprocal of 12 is  $\frac{12}{1}$ .

## Practice

Multiply and reduce to lowest terms. (**Hint:** Factor before multiplying.)

---

8.  $\frac{0}{3} \cdot \frac{5}{7}$

10.  $\left(-\frac{1}{5}\right)\left(-\frac{4}{7}\right)$

9.  $\frac{1}{3} \cdot \frac{3}{4}$

11.  $\frac{5}{16} \cdot \frac{16}{15}$

12.  $\frac{9}{10} \cdot \frac{35}{40} \cdot \frac{25}{15}$

Divide and reduce to lowest terms.

---

13.  $\frac{2}{3} \div \frac{3}{4}$

15.  $\frac{5}{6} \div 0$

14.  $0 \div \frac{5}{6}$

16.  $\frac{14}{15} \div \frac{21}{25}$

## Applications

Solve.

---

17. **Recipes:** A recipe calls for  $\frac{3}{4}$  cups of flour. How much flour should be used if only half of the recipe is to be made?
18. **Demographics:** A study showed that  $\frac{3}{5}$  of the students in an elementary school were left-handed. If the school had an enrollment of 600 students, how many were left-handed?
19. **Geology:** The floor of the Atlantic Ocean is spreading apart at an average rate of  $\frac{3}{50}$  of a meter per year. How long will it take for the ocean floor to spread 12 meters?
20. **Airplane Capacity:** An airplane is carrying 180 passengers. This is  $\frac{9}{10}$  of the capacity of the airplane.
- Is the capacity of the airplane more or less than 180?
  - If you were to multiply 180 times  $\frac{9}{10}$ , would the product be more or less than 180?
  - What is the capacity of the airplane?

