

Warm-Up

1. $\frac{2}{x+1} = \frac{1}{x} - \frac{5x+30}{x^2+x}$

$\frac{\cancel{x(x+1)} 2}{\cancel{x+1}} = \frac{\cancel{x(x+1)} 1}{\cancel{x}} - \frac{\cancel{x(x+1)} (5x+30)}{\cancel{x(x+1)}}$ LCD: $x(x+1)$

$$2x = x+1 - (5x+30)$$

$$2x = x+1-5x-30$$

$$2x = -4x-29$$

$$6x = -29$$

$$x = \frac{-29}{6}$$

CHECK YOUR ANSWER!

Learning Targets

I can...

- Solve Rational Equations
- Set up and solve work word problems

Agenda

- Lesson Check
- Word Problems Together
- Word Problems Independent
- Review Quizzes

If Joe can paint a house in 3 hours and Sam can paint the same house in 5 hours, how long will it take them to paint it together?

$$\begin{aligned} \frac{2}{d} &= r + t \\ 1 &= r \cdot 3 \\ r &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \frac{5}{d} &= r + t \\ 1 &= r \cdot 5 \\ r &= \frac{1}{5} \end{aligned}$$

$$\begin{cases} d = r_1(t) + r_2(t) \\ 1 = \frac{1}{3}(t) + \frac{1}{5}(t) \end{cases}$$

$$1 = \frac{5t}{15} + \frac{3t}{15}$$

LCD: 15

$$15 = 5t + 3t$$

$$15 = 8t$$

$$\left(\frac{15}{8} = t \right)$$

If Ian can eat a watermelon in 7 hours and Colin can eat one in 2 hours, how long would it take to eat one together?

/

Work Formula

$$d = rt$$

d = work completed

r = rate

t = time

Individual

$$d = rt$$

Multiple

$$d = r_1(t) + r_2(t) + \dots$$

Person 1's rate together time Person 2's rate

Mike can wash and wax a car in 4 hours. Ray can do the same job in 3 hours. How long will it take both of them to working together to wash and wax the car?

$$\begin{array}{c} \text{M} \\ \hline 1 = r \cdot 4 \\ r = \frac{1}{4} \end{array}$$

$$\begin{array}{c} \text{R} \\ \hline 1 = r \cdot 3 \\ r = \frac{1}{3} \end{array}$$

$$\begin{aligned} 1 &= \frac{1}{4}(t) + \frac{1}{3}(t) \\ 12 &= \frac{3t}{4} + \frac{4t}{3} \quad \text{LCD: 12} \\ 12 &= 3t + 4t \end{aligned}$$

$$\begin{aligned} 12 &= 7t \\ t &= \frac{12}{7} \text{ hours} \end{aligned}$$

One hose can fill a pool in ^{h_1} 8 hours. A small hose can fill the same pool in ^{h_2} 10 hours. If both hoses are used, how long will it take to fill the pool? _{d}

$$\frac{h_1}{r} = \frac{1}{8}$$

$$\frac{h_2}{r} = \frac{1}{10}$$

$$1 = \frac{1}{8}(t) + \frac{1}{10}(t)$$

$$40 \quad 1 = \frac{5t}{8} + \frac{4t}{10}$$

$$1cd = 40'$$

$$40 = 5t + 4t$$

$$40 = 9t$$

$$t = \frac{40}{9}$$

It takes Jim 3 days to cultivate the garden. It takes Jen 5 days to cultivate the same garden. How long does it take if they work together?

It takes John 6 hours to mow the lawn. If Joe helps him, they can finish the job in 4 hours. How long would it take Joe to mow the lawn all by himself?

John

$$1 = r \cdot 6$$

$$r = \frac{1}{6}$$

Joe

$$r = ? \cdot \frac{1}{x}$$

$$1 = \frac{1}{6}(4) + \frac{1}{x}(4)$$

$$1 = \frac{4}{6} + \frac{4}{x} \quad \text{LCD: } 6x$$

$$6x = 4x + 24$$

$$2x = 24$$

$$x = 12$$

12 hours

Bob can build a brick wall in 8 days. If he works with Sam, they can build the same wall in 4 days. If Sam works alone, how many days will it take him to build the wall?

$$\begin{array}{l} \text{B} \\ r = \frac{1}{8} \\ \hline \text{S} \\ r = \frac{1}{x} \end{array}$$

$$\left\{ \begin{array}{l} 1 = \frac{1}{8}(4) + \frac{1}{x}(4) \\ 8x \quad \quad \quad 8x \\ 1 = \frac{4}{\cancel{8}} + \frac{4}{\cancel{x}} \\ 8x = 4x + 32 \\ 4x = 32 \\ x = 8 \end{array} \right.$$

8 days

Brandi works in a retail store. She can stock the shelves of the entire store in 4 hours. With the help of another employee, Sam, they can complete the job in 3 hours. How long would it take Sam if he was working alone?

It takes Kayla and a helper 24 minutes to feed 18 dogs. Working at the same rate, if they get another person to help, how long will it take all three of them to feed the same 18 dogs?

$$\frac{k+h}{}$$

$$18 = r \cdot 24$$

$$\frac{18}{24} = r$$

$$\frac{3}{4} = r \quad k+h \text{ rate}$$

$$\frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8} \quad \text{Individual rate}$$

$$18 = \frac{3}{8}(+) + \frac{3}{8}(+) + \frac{3}{8}(+)$$

$$18 = \frac{3+}{8} + \frac{3+}{8} + \frac{3+}{8}$$

$$144 = 9+$$

$$+ = 16 \text{ minutes}$$

It takes 4 construction workers 6 days to complete a brick patio. If they want to finish the patio in 3 days, how many workers will they need?

together
time

4 workers

$$1 = r \cdot 6$$

$$r = \frac{1}{6}$$

$$\frac{1}{6} \cdot \frac{1}{4}$$

$$\frac{1}{24} = r \text{ Individual}$$

$$1 = \frac{1}{24}(3)X$$

$$1 = \frac{3}{24}X \frac{24}{3}$$

$$\frac{24}{3} = X$$

$$8 = X$$

8 workers

6 workers can retile a kitchen in 17 hours. If three more workers are added, how long will it take all 9 workers to retile the same kitchen?

6 workers

$$r = \frac{1}{17}$$

Individual

$$r = \frac{1}{102}$$

$$1 = \frac{1}{102}(+) \cdot 9$$

$$\frac{102}{9} \mid = \frac{9}{102}(+) \frac{102}{9}$$

$$+ = \frac{102}{9}$$

$$+ = 11.\overline{3} \text{ hours}$$

