

Chapter 6 section 7  
Formulas and applications of Rational Equations

### Solving a Formula for a Variable

The goal is to get the specified variable alone on one side of the equation.

Example: Solve the formula for the variable  $r$ :  $S = \frac{C}{1-r}$

Solution:

Solve the equation for  $r$ .

Multiply both sides by the common denominator,  $1 - r$

$$S(1-r) = \frac{C}{1-r}(1-r)$$

Use the distributive property on the left and reduce on the right

$$S - Sr = C$$

Subtract  $S$

$$-Sr = C - S$$

Divide by  $-S$

$$r = \frac{C - S}{-S}$$

Solve for  $x$ :  $a = \frac{b}{x+2}$

## Problems Involving Motion.

Show video: <https://www.youtube.com/watch?v=m2eyq9qTOQY>

Motion formula:  $d = rt$  distance traveled going at a  $r$ , rate for  $t$ , time

Example: Rate of 30 miles per hour for one hour, one travels 30 miles

Solve the equation for  $t$

$$\text{Time traveled} = \frac{\text{distance traveled}}{\text{Rate of travel}}$$

Example: Page 476 # 26

A car can travel 300 miles in the same amount of time it takes a bus to travel 180 miles. If the rate of the bus is 20 miles per hour slower than the rate of the car, find the average rate for each.

Solution:

Make a table:

Let  $r$  = rate of car

	Rate	Time	Distance
Car	$r$		300
Bus	$r - 20$		180

$$\text{Since } t = \frac{d}{r}$$

Find the time for the car and bus using the information in the table.

Since the time traveled for the bus and car is the same, set the times equal and solve for  $r$ .

$$\frac{300}{r} = \frac{180}{r-20}$$

$$r = 50$$

Now answer the question that the problems ask.

Solving a Problem Involving Work.

Page 476 # 37.

You promised your parents that you would wash the family car. You have not started the job and they are due home in 20 minutes. You can wash the car in 45 minutes and your sister claims she can do it in 30 minutes. If you work together, how long will it take to do the job? Will this give you enough time before your parents return?

Solution

You

One hour

two hours

Sister

One hour

two hours

Let  $x$  = time working together

$$\frac{x}{45} + \frac{x}{30} = 1$$

Solve for  $x$

$$x = 18$$

Answer the question to the problem