

Section 1.2

Section 1.2 Guided Notebook

Section 1.2 Applications of Linear and Rational Equations

- Work through TTK #4
- Work through Objective 1
- Work through Objective 2
- Work through Objective 3
- Work through Objective 4
- Work through Objective 5

Section 1.2 Applications of Linear and Rational Equations

1.2 Things To Know

4. Solving Rational Equations that Lead to Linear Equations (Section 1.1)

Solve the rational equation $\frac{2}{x+4} + \frac{1}{x-5} = \frac{5}{x^2 - x - 20}$.

Watch the video to check your solution.

Section 1.2 Objective 1: Converting Verbal Statements into Mathematical Statements

Work through Example 1 and show all work below. Watch the video to check your solutions.

Rewrite each statement as an algebraic expression or equation.

- a. 7 more than three times a number.

- b. 5 less than twice a number

- c. Three times the quotient of a number and 11
- d. The sum of a number and 9 is 1 less than half of the number.
- e. The product of a number and 4 is 1 more than 8 times the difference of 10 and the number.

What is the caution statement with Example 1 part b about?

Who is George Polya and what is he known for?

Write down Polya's Guidelines for Problem Solving.

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What is the Four-Step Strategy for Problem Solving?

Step 1

Step 2

Step 3

Step 4

Section 1.2 Objective 2: Solving Applications Involving Unknown Numeric Quantities

Work through Example 2 and show all work below.

Roger Staubach and Terry Bradshaw were both quarterbacks in the National Football League. In 1973, Staubach threw three touchdown passes more than twice the number of touchdown passes thrown by Bradshaw. If the total number of touchdown passes between Staubach and Bradshaw was 33, how many touchdown passes did each player throw?

Work through Example 3 and show your work below. Watch the video to check your solution.

One number is three times another number. Determine the two numbers if the sum of their reciprocals is 4.

Section 1.2 Objective 3: Solving Applications Involving Geometric Formulas

Work through Example 4 and show your work below. Watch the video to check your solution.

The length of a college basketball court (rectangle) is 6 feet less than twice its width. If the perimeter is 288 feet, what are the dimensions of the court?

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Work through Example 5 and show your work below. Watch the video to check your solution.

Suppose that the area of a trapezoid can be represented by the expression $\frac{6}{x}$ square feet and suppose that the lengths of the parallel bases of the trapezoid can be represented by the expressions $\frac{2}{x}$ feet and $\frac{3}{x+1}$ feet respectively. If the height is 4 feet, determine the value of x . Then determine the area and values of the lengths of the parallel bases.

Section 1.2 Objective 4: Solving Applications Involving Decimal Equations (Money, Mixture, Interest)

Work through the video with Example 6 and take notes below.

Billy has \$16.50 in his piggy bank, consisting of nickels, dimes, and quarters. Billy notices that he has 20 fewer quarters than dimes. If the number of nickels is equal to the number of quarters and dimes combined, how many of each coin does Billy have?

Work through the video with Example 7 and show all work below.

How many milliliters of a 70% acid solution must be mixed with 30 mL of a 40% acid solution to obtain a mixture that is 50% acid?

Work through the video with Example 8 and show all work below.

Kristen inherited \$20,000 from her aunt Dawn Ann, with the stipulation that she invest part of the money in an account paying 4.5% simple interest and the rest in an account paying 6% simple interest locked in for 3 years. If at the end of 1 year, the total interest earned was \$982.50, how much was invested at each rate?

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Section 1.2 Objective 5: Solving Applied Problems Involving Uniform Motion

What is the relationship between distance, rate, and time?

Work through the video with Example 9 and show all work below.

Rick left his house on his scooter at 9:00 AM to go fishing. He rode his scooter at an average speed of 10 mph. At 9:15 AM his girlfriend Deb (who did not find Rick at home) pedaled after Rick on her new 10 speed bicycle at a rate of 15 mph. If Deb caught up with Rick at precisely the time they both reached the fishing hole, how far is it from Rick's house to the fishing hole? At what time did Rick and Deb arrive at the fishing hole?

Work through Example 10 and take notes below.

An airplane that can maintain an average velocity of 320 mph in still air is transporting smokejumpers to a forest fire. On takeoff from the airport, it encounters a headwind and takes 34 minutes to reach the jump site. The return trip from the jump site takes 30 minutes. What is the speed of the wind? How far is it from the airport to the fire?

Work through Example 11 and take notes below. Watch the video to check your solution.

Emalie can travel 16 miles upriver in the same amount of time it takes her to travel 24 miles downriver. If the speed of the current is 4 mph, how fast can her boat travel in still water?

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Section 1.2 Objective 6: Solving Applications Involving Rates of Work

Write down the information seen in the box titled “**Rate of Work.**”

Work through Example 12 answering the questions below. Watch the video to check your solution.

Brad and Michelle decide to paint the entire upstairs of their new house. Brad can do the job by himself in 8 hours. If it took them 3 hours to paint the upstairs together, how long would it have taken Michelle to paint it by herself?

How much of the job can Brad complete in 1 hour by himself? Why?

How much of the job will be completed in one hour if Brad and Michelle work together? Why?

Explain the equation in Method 1 and solve the equation.

In Method 2, why is the rate to complete the job $\frac{1}{8} + \frac{1}{t}$?

Be sure you can solve the equation and get a result of $\frac{24}{5}$. Show work below.

Work through the video with Example 9 and take notes below.

Jim and Earl were replacing the transmission on Earl's old convertible. Earl could replace the transmission by himself in 8 hours, whereas it would take Jim 6 hours to do the same job. They worked together for 2 hours, but then Jim had to go to his job at the grocery store. How long did it take Earl to finish replacing the transmission by himself?

What equation is used in Method 2?

Draw the chart that is in the video. Complete the information.

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What does the expression $2\left(\frac{1}{6} + \frac{1}{8}\right)$ represent? Show the steps to simplify this expression below.

How do you know Earl must complete $\frac{5}{12}$ of the job by himself?

What does t represent?

Explain the equation $x\left(\frac{1}{8}\right) = \frac{5}{12}$.

Show the steps to solve the equation below.

How long did it take Earl to finish replacing the transmission by himself?