

I'm not robot!

Two-Step Equation Word Problems

- 1) 331 students went on a field trip. Six buses were filled and 7 students traveled in cars. How many students were in each bus?
- 2) Alyah had \$24 to spend on seven pencils. After buying them she had \$10. How much did each pencil cost?
- 3) The sum of three consecutive numbers is 72. What are the smallest of these numbers?
- 4) The sum of three consecutive even numbers is 48. What are the smallest of these numbers?
- 5) You bought a magazine for \$5 and four erasers. You spent a total of \$25. How much did each eraser cost?
- 6) Maria bought seven boxes. A week later half of all her boxes were destroyed in a fire. There are now only 22 boxes left. With how many did she start?
- 7) Sammie won 40 super bouncy balls playing basketball at her school's game night. Later, she gave two to each of her friends. She only has 8 remaining. How many friends does she have?
- 8) Imani spent half of her weekly allowance playing mini-golf. To earn more money her parents let her wash the car for \$4. What is her weekly allowance if she ended with \$12?

World Problems: Systems of Equations

Name: _____

Mr. Karolynka

(Show work for credit.)

Set up a system of equations for each problem. Then, solve each system by whatever mathematical means you prefer.

- 1) John bought tickets and chairs for his restaurant. He bought 10 total items and spent \$2400. Each table cost \$150 and each chair cost \$30. Let x represent the number of tables and y represent the number of chairs. How many tables and chairs did he buy?
- 2) Mia buys 100 books for her book club. She will buy two types of books: large-fiction title and small genre books. She charges \$1 for the large title title and \$0.50 for the small genre book and collected \$100 total. How many of each type did she buy?
- 3) Peter's Toy Store sold 200 total items from the website with 400 items (20 each) and 160 items (10 each) were available. It took \$1000 in sales. How many items and how many websites did it sell?
- 4) Penelope's Printing Press promptly sold 3 more pencils and 10 more pens to the public. It sold 1000 writing materials and took in \$26.70 in sales. How many pens and how many pencils did Penelope's Printing Press sell?
- 5) Jay "Whistleblow" Blawell used to shuffle decks as a club jockey. He had 90 CDs, which were rock and reggae CDs. He bought 10 CDs at a bulk rate \$4 for rock and \$3 for reggae CDs. If his collection was worth \$280, how many of each type of CD did he own?
- 6) 100 items for sale including computers. The items accounted for 1000 items and were the same amount of money, which is a total of 100 items. She charges \$40 for computers and \$10 for software. How many computers of each type does she charge?
- 7) These manufacturers Mexican and American flags. Due to the state of sales, she charges \$10 for Mexican flags and \$15 for American flags. She will receive eight flags and received \$100. How many flags of each type did she sell?
- 8) Kelly's Toy Store had a special on teddy bears. It will sell AA for \$1 and AAA for \$0.75. It will sell 10 teddy bears and received \$10. How many teddy bears of which type were sold?

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Chapter 10: Systems of Equations and Inequalities

Section 10.1: Systems of Linear Equations in Two Variables

Example 1: Solving a System of Linear Equations

Solve the system of linear equations by graphing.

$$\begin{cases} x + y = 5 \\ 2x - y = 1 \end{cases}$$

Graph the system of linear equations on a coordinate plane.

The solution is the point where the two lines intersect.

The solution is $(2, 3)$.

Check: $2 + 3 = 5$ and $2(2) - 3 = 1$. The solution is correct.

For help with this problem, go to [MathZone.com](#), Section 8, Lesson 17.

Standard H.1A.4.C1: I can solve a one-step equation.

Directions: Solve

- | | | | | |
|--------------------------|--------------------------|-------------------------|---------------------------|--------------------------|
| 1. $w + 8 = -3$ | 2. $-1 + x = -10$ | 3. $100 = x + 20$ | 4. $-15 + r = 60$ | 5. $x + 12 = 30$ |
| 6. $h + 13 = 7$ | 7. $-14 = 3 + x$ | 8. $32 = n + 5$ | 9. $d - 9 = -5$ | 10. $w - 4 = 8$ |
| 11. $28 = h - 11$ | 12. $w - 7 = -20$ | 13. $12 + n = 7$ | 14. $2 + x = 24$ | 15. $-36 = n - 12$ |
| 16. $6x = 24$ | 17. $9k = 63$ | 18. $28 = 2n$ | 19. $-5y = 30$ | 20. $-8q = 64$ |
| 21. $-21 = 7m$ | 22. $18v = -18$ | 23. $-3x = -27$ | 24. $-60 = -12t$ | 25. $-x = 11$ |
| 26. $\frac{x}{2} = 7$ | 27. $\frac{c}{7} = 56$ | 28. $\frac{1}{9}y = 20$ | 29. $\frac{k}{3} = -4$ | 30. $21 = \frac{m}{2}$ |
| 31. $-3 = \frac{1}{18}n$ | 32. $\frac{1}{2}y = 14$ | 33. $\frac{6}{5}x = 24$ | 34. $\frac{11}{4}v = -18$ | 35. $\frac{2}{3}k = 63$ |
| 36. $-18 = \frac{x}{4}$ | 37. $\frac{3}{4}x = -27$ | 38. $28 = \frac{2}{3}n$ | 39. $\frac{1}{3}x = 11$ | 40. $-60 = \frac{1}{5}t$ |

Kaylee wants to do well in her classes, so she is budgeting her time carefully to decide the number of classes, c , she will take this year. For each class that she takes, she expects to spend $2\frac{1}{2}$ hours each week working on homework. She expects to spend an additional $\frac{1}{2}$ hour each week completing the assigned reading for all of her classes together. If Kaylee has 19 hours available each week to complete homework and reading for her classes, which equation best models the situation?

$19 = 2\frac{1}{2}c + \frac{1}{2}$
homework

$2\frac{1}{2}c - \frac{1}{2} = 19$
 $2\frac{1}{2}c + \frac{1}{2} = 19$
 $6\frac{1}{2}c - 2\frac{1}{2} = 19$
 $6\frac{1}{2}c + 2\frac{1}{2} = 19$

Worked-out word problems on linear equations with solutions explained step-by-step in different types of examples. There are several problems which involve relations among known and unknown numbers and can be put in the form of equations. The equations are generally stated in words and it is for this reason we refer to these problems as word problems. With the help of equations in one variable, we have already practiced equations to solve some real life problems. Steps involved in solving a linear equation word problem: ● Read the problem carefully and note what is given and what is required and what is given. ● Denote the unknown by the variables as x, y, \dots . ● Translate the problem to the language of mathematics or mathematical statements. ● Form the linear equation in one variable using the conditions given in the problems. ● Solve the equation for the unknown. ● Verify to be sure whether the answer satisfies the conditions of the problem. 1. The sum of two numbers is 25. One of the numbers exceeds the other by 9. Find the numbers. Solution: Let the other number be x . Then the other number is $x + 9$. Sum of two numbers = 25. According to question, $x + x + 9 = 25 \Rightarrow 2x + 9 = 25 \Rightarrow 2x = 25 - 9 = 16 \Rightarrow x = 8$. Therefore, the two numbers are 8 and 17. 2. The difference between the two numbers is 48. The ratio of the two numbers is 7:3. What are the two numbers? Solution: Let the common ratio be x . Then the two numbers are $7x$ and $3x$. Their difference = 48. According to the question, $7x - 3x = 48 \Rightarrow 4x = 48 \Rightarrow x = 12$. Therefore, the two numbers are $7 \times 12 = 84$ and $3 \times 12 = 36$. 3. The length of a rectangle is 72 metre, find the length and breadth of the rectangle. Solution: Let the length of the rectangle be x . Then the breadth of the rectangle is $2x$. Perimeter of the rectangle = 72. Therefore, according to the question, $2(x + 2x) = 72 \Rightarrow 2 \times 3x = 72 \Rightarrow 6x = 72 \Rightarrow x = 12$. We know, length of the rectangle = $2x = 2 \times 12 = 24$. Therefore, length of the rectangle is 24 m and breadth of the rectangle is 12 m. 4. Aaron is 5 years younger than Ron. Four years later, Ron will be twice as old as Aaron. Find their present ages. Solution: Let Ron's present age be x . Then Aaron's present age = $x - 5$. After 4 years Ron's age = $x + 4$, Aaron's age = $x - 5 + 4 = x - 1$. According to the question, Ron will be twice as old as Aaron. Therefore, $x + 4 = 2(x - 1) \Rightarrow x + 4 = 2x - 2 \Rightarrow x = 6$. Therefore, Aaron's present age = $x - 5 = 6 - 5 = 1$. Therefore, present age of Ron = 6 years and present age of Aaron = 1 year. 5. A number is divided into two parts, such that one part is 10 more than the other. If the two parts are in the ratio 5 : 3, find the number and the two parts. Solution: Let one part of the number be x . Then the other part of the number is $x + 10$. The ratio of the two numbers is 5 : 3. Therefore, $\frac{x}{x + 10} = \frac{5}{3} \Rightarrow 3x = 5(x + 10) \Rightarrow 3x = 5x + 50 \Rightarrow -2x = 50 \Rightarrow x = -25$. Therefore, the number = $x + x + 10 = -25 - 25 + 10 = -40$. The two parts are 15 and 25. 6. Robert's father is 4 times as old as Robert. After 5 years, father will be three times as old as Robert. Find their present ages. Solution: Let Robert's age be x years. Then Robert's father's age = $4x$. After 5 years, Robert's age = $x + 5$. Father's age = $4x + 5$. According to the question, $x + 5 = \frac{1}{3}(4x + 5) \Rightarrow 3(x + 5) = 4x + 5 \Rightarrow 3x + 15 = 4x + 5 \Rightarrow x = 10$. Therefore, Robert's present age is 10 years and that of his father's age = 40 years. 7. The sum of two consecutive multiples of 5 is 55. Find these multiples. Solution: Let the first multiple of 5 be x . Then the other multiple of 5 will be $x + 5$ and their sum = 55. Therefore, $x + x + 5 = 55 \Rightarrow 2x + 5 = 55 \Rightarrow 2x = 55 - 5 = 50 \Rightarrow x = 25$. Therefore, the multiples of 5, i.e., $x + 5 = 25 + 5 = 30$. Therefore, the two consecutive multiples of 5 whose sum is 55 are 25 and 30. 8. The difference in the measures of two complementary angles is 12° . Find the measure of the angles. Solution: Let the angle be x . Complement of $x = 90 - x$. Given their difference = 12° . Therefore, $(90 - x) - x = 12 \Rightarrow 90 - 2x = 12 \Rightarrow -2x = 12 - 90 \Rightarrow -2x = -78 \Rightarrow 2x = 78 \Rightarrow x = 39$. Therefore, the two complementary angles are 39° and 51° . 9. The cost of two tables and three chairs is \$705. If the table costs \$40 more than the chair, find the cost of the table and the chair. Solution: Let the cost of the chair be x . Then the cost of the table = $x + 40$. The cost of 2 tables = $2(x + 40)$ and the cost of 3 chairs = $3x$. Total cost of 2 tables and 3 chairs = \$705. Therefore, $2(x + 40) + 3x = 705 \Rightarrow 2x + 80 + 3x = 705 \Rightarrow 5x + 80 = 705 \Rightarrow 5x = 705 - 80 = 625 \Rightarrow x = 125$. Therefore, the cost of each chair is \$125 and that of each table is \$165. 10. If $\frac{3}{5}$ of a number is 4 more than $\frac{1}{2}$ of the number, then what is the number? Solution: Let the number be x . Then $\frac{3}{5}x = \frac{1}{2}x + 4 \Rightarrow \frac{3}{5}x - \frac{1}{2}x = 4 \Rightarrow \frac{6x - 5x}{10} = 4 \Rightarrow \frac{x}{10} = 4 \Rightarrow x = 40$. Therefore, the required number is 40. 11. Try to follow the methods of solving word problems on linear equations and then observe the detailed instruction on the application of equations to solve the problems. ● Equations: What is an Equation? What is a Linear Equation? How to Solve Linear Equations? Solving Linear Equations: Problems on Linear Equations in One Variable: Word Problems on Linear Equations in One Variable: Practice Test on Linear Equations: Practice Test on Word Problems on Linear Equations: Equations - Worksheets: Worksheet on Linear Equations: Worksheet on Word Problems on Linear Equation: 7th Grade Math Problems: 8th Grade Math Practice From Word Problems on Linear Equations to HOME PAGE Didn't find what you were looking for? Or want to know more information about Math Only Math. Use this Google Search to find what you need. Share this page: What's this? 1 Lesson 5.4 Write Linear Equations in Standard Form Word Problems Essential Question: How do you write an equation in standard form? 2 Gardening A gardener has \$300 to spend on plants. Vinca plants cost \$1. Gardening A gardener has \$300 to spend on plants. Vinca plants cost \$1.20 each and phlox plants cost \$2.50 each. Write an equation in standard form that models the possible combinations of vinca and phlox plants the gardener can buy. List several possible combinations. 3 Fruit The grocery store has grapes that sell for \$2. Fruit The grocery store has grapes that sell for \$2.25 a pound and oranges that sell for \$1.90 a pound. You have \$20 to spend. Write an equation in standard form that models the possible combinations of pounds of grapes and oranges you can buy. List several possible combinations. 4 Campground You have \$96 to spend on campground activities. Campground You have \$96 to spend on campground activities. You can rent a paddleboat for \$8 per hour and a kayak for \$6 per hour. Write an equation in standard form that models the possible combinations of activities you can afford. List several possible combinations. 5 Fundraiser Your school is sponsoring a pancake dinner to raise money for a field trip. You estimate that 200 adults and 250 children will attend. You want to raise \$3800. Write an equation in standard form that models the possible combinations of adults and children that need to attend to reach your goal. List several possible combinations. 6 Library Your class is taking a trip to the public library. Library Your class is taking a trip to the public library. You can travel in small and large vans. A small van holds 8 people and a large van holds 12 people. Your class could fill 15 small vans and 2 large vans. Write an equation in standard form that models the possible combinations of small vans and large vans that your class could fill. List several possible combinations. 7 Clothing T-shirts at a flea market cost \$4. Clothing T-shirts at a flea market cost \$4.50 each and shorts cost \$6 each. You have enough money to buy exactly 12 T-shirts and 9 pair of shorts. Write an equation in standard form that models the possible combinations of T-shirts and shorts you can buy. List several possible combinations. 8 Nutrition A snack mix requires a total of 120 ounces of some corn cereal and some wheat cereal. Corn cereal comes in 12 ounce boxes. The last time you made this mix, you used 5 boxes of corn cereal and 4 boxes of wheat cereal. How many ounces are in a box of wheat cereal? Write an equation in standard form that models the possible combinations of boxes of wheat and corn cereal you can use. List several possible combinations. 9 How do you write an equation in standard form? 10 Ticket Out the Door Gardening You have a rectangular plot measuring 400 square feet in a community garden. You want to grow tomato plants that each need 8 square feet of space and pepper plants that each need 5 square feet. Write an equation that models how many tomato plants and how many pepper plants you can grow. We've studied word problems that allow you to write an equation in slope intercept form. How do we know when a problem should be solved using an equation written in standard form? As you are reading and analyzing the word problem, if you find that you can set up an addition problem, and you have a set total (constant), then you will be able to write an equation in standard form. Let's look at a couple of examples. Solving Word Problems Your school is sponsoring a pancake dinner to raise money for a field trip. You estimate that 200 adults and 250 children will attend. Let x represent the cost of an adult ticket and y represent the cost of a child ticket. Write an equation that can be used to find what ticket prices to set in order to raise \$3800. Solution First, think about what we know. We know that you want to raise \$3800. This is a constant. Therefore, it will be C in your standard form equation. We also know that in order to find our total, we need to multiply the number of people by the cost of the ticket. If we add the adult tickets and children tickets together, we will have a total. $Ax + By = C$. $200x + 250y = 3800$. Here's a more thorough explanation. I know how difficult it is to not only learn the skill, but then to be able to apply the skill. It is hard and unfortunately, it just takes practice! If you are struggling with this concept, then check out the Algebra Class E-course. Within this E-course, you will find a lot of word problems that will not only help as you study for your tests, but that will also help you in real-life situations. Often times, text book word problems are pretty "far out"; however Algebra Class word problems are more realistic and easy to relate to every day living. For more information, click here. Let's look at one more example. Example 2: Another Word Problem! You are running a concession stand at the basketball game. You sell hot dogs for \$1 and sodas for \$0.50. At the end of night, you made \$200. Let x represent the number of hot dogs sold and y represent the number of sodas sold. Write an equation that can be used to determine how many hot dogs and how many sodas were sold. Solution Think about what you know. We know that our total for the end of the night was \$200, therefore, it is our constant (C) in the equation. We also have information for the price of the hot dogs and the price of the sodas. $Ax + By = C$. $1x + 0.50y = 200$. Here's another way to think of it! I know it's hard to imagine when you will need to use this skill, or even how to solve problems written in this form. You will be writing these equations and solving them when you get to the Systems of Equations Unit. So, stick with me - it will all come together and make sense. Home > Writing Equations > Word Problems

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