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Approaching Word Problems notes

Word Problem Positivity

The world is full of word problems! Will my income qualify me to rent that apartment? Do I have enough money to purchase that new gaming systems? Should I drive or fly to our family reunion? How much money do I need to fill the car with gas? How much should I tip at the restaurant? How many outfits should I pack for my trip? What size turkey do I need to buy for Thanksgiving, when do I need to pull it out of the freezer, and when do I need to put it in the oven? How many weeks do I need to save my allowance to purchase that gift?

Now that we can solve equations, we are ready to apply our new skills to word problems. Have you ever had any negative experiences in the past with word problems? When we feel we have no control and repeat negative thoughts, we set up barriers to success. We need to calm our fears and change our negative feelings. We can do that by starting with a fresh slate and thinking positive thoughts. You are what you think! If you take control and believe you can be successful, that is the first step to mastering word problems! Remember, you may not be great at them YET, but if you keep learning and practicing, you WILL become a word problem master. ☺

Use a Problem-Solving Strategy for Word Problems

We have reviewed translating English phrases into Algebraic expressions using some basic mathematical vocabulary and symbols. We have also translated English sentences into algebraic equations and solved some word problems. We restated the situation in one sentence, assigned a variable, and then wrote an equation to solve the problem. We can do essentially the same thing to solve any problem.

Example

Priya bought a shirt on sale for $18, which is one-half of the original price. What was the original price of the purse?	Gabby and her classmates formed a study group. The number of girls in the study group was three more than twice the number of boys. There were 11 girls in the study group. How many boys were in the study group?

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your turn

Jake bought a bookcase on sale for $120, which was two–thirds of the original price. What was the original price of the bookcase?	Two-fifths of the songs in Mary's playlist are jazz. If there are 20 jazz songs, what is the total number of songs in the playlist?
Gary bought textbooks and comic books at the bookstore. The number of textbooks was three more than twice the number of comic books. He bought 7 textbooks. How many comic books did he buy?	Justin worked Sudoku puzzles and crossword puzzles this week. The number of Sudoku puzzles he completed is eight more than twice the number of crossword puzzles. How many crossword puzzles did he do?

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Solve Number Problems notes

Number Problems

Now that we have a problem-solving strategy, we will use it on several different types of word problems. The first type we will work on is "number problems." Number problems give some clues about one or more numbers. We can think of these types of problems as riddles to solve. They don't usually arise on an everyday basis, but its good practice for critical thinking and problem-solving skills, and they are, dare I say it, even FUN!

Some number word problems ask us to find two or more numbers. You might want to assign each number a different variable, but in order to solve these as linear equations, you want to define the numbers in terms of the SAME variable. For example, "one number is three more than another" could be written as x and $x + 3$ because you have one number, and then you have another number 3 more than the first one. Let's see it in action in these examples!

Example

The difference of a number and six is 13. Find the number.	The sum of twice a number and seven is 15. Find the number.
One number is five more than another. The sum of the numbers is 21. Find the numbers.	The sum of two numbers is negative fourteen. One number is four less than the other. Find the numbers.
One number is ten more than twice another. Their sum is one. Find the numbers.	

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your turn

The difference of a number and nine is 17. Find the number.	The difference of a number and twelve is -7. Find the number.
The sum of four times a number and two is 14. Find the number.	The sum of three times a number and 8 is 26.
One number is six more than another. The sum of the numbers is twenty-four. Find the numbers.	The sum of two numbers is fifty-four. One number is four more than the other. Find the numbers.
The sum of two numbers is negative twenty-three. One number is seven less than the other. Find the numbers.	One number is three more than three times another. Their sum is -5. Find the numbers.

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Consecutive Integers Problems notes

Consecutive Number Problems

Some number problems involve consecutive integers. *Consecutive integers* are integers that immediately follow each other. Examples of consecutive integers are:

1, 2, 3, 4
-3, -2, -1, 0
245, 246, 247, 248

Notice that each number is one more than the number preceding it. So, if we define the first integer as n, the next consecutive integer is n + 1. The one after that is one more than n + 1, so it is n + 1 + 1, which is n + 2.

n	1st integer
n + 1	2nd consecutive integer
n + 2	3rd consecutive integer

Example

The sum of two consecutive integers is 47. Find the numbers.	Find three consecutive integers whose sum is -42.
Your Turn!	
The sum of two consecutive integers is 95. Find the numbers.	The sum of two consecutive integers -31. Find the integers.
Find three consecutive integers whose sum is -96.	Find three consecutive integers whose sum is -36.

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Consecutive Even Number Problems

Now that we have worked with consecutive integers, we will expand our work to included consecutive even integers and consecutive odd integers. Consecutive even integers are even integers that immediately follow one another. Examples of consecutive even integers are:

2, 4, 6, 8
-4, -2, 0, 2
344, 346, 348, 350

Notice that each number is two more than the number preceding it. If we call the first integer n, the next consecutive integer is n + 2. The one after that is two more than n + 2, so it is n + 2 + 2, which is n + 4.

n	1st even integer
n + 2	2nd consecutive even integer
n + 4	3rd consecutive even integer

Consecutive Odd Number Problems

In a similar manner, consecutive odd integers are odd integers that immediately follow one another. Examples of consecutive odd integers are:

1, 3, 5, 7
-3, -1, 1, 3
355, 357, 359, 361

We still add two to the previous number to get the next consecutive odd integer. Therefore, we call the first even OR odd integer as n, the next consecutive even OR odd integer is n + 2, the next one after that is n + 4., and so on. The pattern remains the same!

n	1st odd integer
n + 2	2nd consecutive odd integer
n + 4	3rd consecutive odd integer

Example

The sum of two consecutive even integers is 84. Find the number.	A married couple earns $110,000 a year together. The wife earns $16,000 less than twice what her husband earns. What does the husband earn?

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your turn

Find three consecutive even integers whose sum is 102.

Find three consecutive even integers whose sum is -24.

According to the National Automobile Dealers Association, the average cost of a car in 2014 was $28,500. This was $1,500 less than 6 times the cost in 1975. What was the average cost of a car in 1975?

U.S. Census data shows that the median price of new home in the United States in November 2014 was $280,900. This was $10,700 more than 14 times the price in November 1964. What was the median price of a new home in November 1964?

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Unit 3.1 Use a Problem-Solving Strategy *Practice*

Follow the directions.

1. List four positive thoughts you can say to yourself that will help you approach word problems with a positive attitude.

2. Two-thirds of the children in the fourth-grade class are girls. If there are 30 girls, what is the total number of children in the class?

3. One-fourth of the candies in a bag are blue. If there are 19 blue candies, how many candies are in the bag?

4. Harry is organizing the paperback and hardback books for her club's used book sale. The number of paperbacks is 12 less than three times the number of hardbacks. Harry has 162 paperbacks. How many hardbacks are there?

5. Mark just bought a truck for $54,000. This is $3,506 less than twice what his wife paid for her car last year. How much did his wife pay for her car?

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Unit 3.1 Use a Problem-Solving Strategy *Practice*

Solve each number word problem.

6. The sum of a number and eight is 12. Find the number.

7. The difference of a number and 15 is 6. Find the number.

8. The sum of four times a number and six is 30. Find the number.

9. The difference of twice a number and nine is 19. Find the number.

10. Three times the sum of a number and nine is 12. Find the number.

11. One number is 11 less than another. If their sum is increased by eight, the result is 71. Find the numbers.

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Unit 3.1 Use a Problem-Solving Strategy *Practice*

Solve each number word problem.

12. The sum of two numbers is 14. One number is two less than three times the other. Find the numbers.

13. The sum of two numbers is zero. One number is nine less than twice the other. Find the numbers.

14. The sum of two consecutive integers is 77. Find the integers.

15. The sum of two consecutive integers is -23. Find the integers.

16. Find three consecutive integers whose sum is -3.

17. Find three consecutive even integers whose sum is 258.

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Unit 3.1 Use a Problem-Solving Strategy *Practice*

Solve each number word problem.

18. Find three consecutive integers whose sum is -36.

19. Find three consecutive even integers whose sum is 222.

20. Find three consecutive even integers whose sum is -84.

21. Find three consecutive odd integers whose sum is -213.

22. What has been your past experience solving word problems?