Chapter 30: Word Problems



One of the challenges of the SAT Math Test is dealing with everyone's least favorite questions: word problems. Word problems are often written in a way that makes it difficult to figure out exactly what is happening in the question. Word problems includes a wide variety of math topics that we have already learned in this book, so we will not cover any particular type of word problem in this chapter. Instead, we will focus on the tips that can help you solve all types of word problems more effectively and efficiently.

Tip #1 – Do Not Be Intimidated

Word problems look scary. Many students see a big paragraph and say, "no way, I can't solve that." They feel intimidated before even trying to solve the question. Do not let this be you! Word problems at their core are no more difficult than any other SAT Math questions. When you see a math question with a big paragraph on test day, take a deep breath and solve it one step at a time.

Tip #2 – Turn Words into Equations

When approaching a word problem, take it one sentence at a time. As you read through the question, identify each key piece of information, and write it down in an equation if necessary. If you can convert the question from a word problem into an equation or equation(s), the question will be much easier to solve.

Often, word problems are actually just systems of equations questions. For questions like these, which we covered in Chapter 12, you will need to write down two equations. Once you have converted the word problem into two equations, you will be able to solve the question with the methods we learned in Chapter 12.

Tip #3 – Backsolve with the Answer Choices

For some word problems, writing your own equation(s) is very difficult. If you cannot write out the equation(s) or are not sure if the equation(s) that you wrote are correct, see if you can use the backsolving method we learned in Chapter 1. Sometimes it is easier to backsolve by taking the answer choices, going through the steps of the word problem, and seeing if the answer choice you selected works. Even if you cannot tell which answer is correct, backsolving can often help you eliminate some answer choices and make a better guess. If you need to review how to backsolve, go back to Chapter 1.

Tip #4 – Guess and Move on (If You Have To)

If you get to a word problem, try using the tips above, and still have no idea how to solve it, mark the question for review, select your best guess, and move on! It is easy to waste a lot of time reading and re-reading long, confusing word problems. Students who do this often end up running out of time. Save those precious minutes to answer more questions that you know how to solve. We know it sounds backwards but giving up quickly on a word problem that you have no idea how to solve may help you actually get a better score.

If you complete the rest of the questions in the section and have time remaining, you can always come back to any questions that you guessed on. Sometimes when re-reading the question, you will realize how to solve it. It is easier to think more clearly when you are no longer worried about finishing the rest of the questions in the section.

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Word Problems Practice: Answers on pages 333-334.

(2) 1. Last weekend, Jenny made x cookies per hour for 2 hours, and Cara made y cookies per hour for 3 hours. Which of the following represents the total number of cookies made by Jenny and Cara?

A) $6xy$
B) $3x + 2y$
C) $2x + 3y$
D) $5xy$

(2) 2. Jimmy is a lawyer. Every week, Jimmy has new clients who need their Wills drafted. The number of Wills that Jimmy needs to finish each week is estimated by the equation $W = 42 - 7d$, where W represents the number of Wills left and d is the number of days he has worked. What is the meaning of the number 42 in this equation?

A) Jimmy will finish the Wills in 42 days.
B) Jimmy finishes 42 Wills per day.
C) Jimmy finishes 6 Wills per hour.
D) Jimmy starts each week with an estimated 42 Wills to complete.

(2) 3. Chris was skateboarding at 8 feet per second when he came to the top of a hill. After riding down the hill for 3.5 seconds, he was moving at 43 feet per second. Assuming the acceleration was constant, what was his acceleration in feet per second?

A) 8
B) 10
C) 12
D) 14

(2) 4. A company decides to sponsor an employee softball team. The cost to form the team is \$75 per member plus a onetime \$50 team registration fee. What is the maximum number of team members who can join the team, if the company can spend \$780 for the softball team?

(2) 5. The equation below relates the number of avocados, x, John buys each week and the number of bananas, y, John buys each week. If each avocado costs \$2.25 and each banana costs \$0.75, what does the number 35 represent?

$$2.25x + 0.75y = 35$$

A) The number of avocados purchased each week.
B) The amount of money spent purchasing avocados and bananas each week.
C) The total number of avocados and bananas purchased each week.
D) The difference between the number of the avocados and the number of bananas purchased each week.

(2) 6. Jason bought five burgers for a total of \$30.97 including a \$0.22 sales tax. What would be the cost without sales tax if Jason bought four burgers?

A) \$18.00
B) \$20.25
C) \$24.60
D) \$28.00

(2) 7. The given equation below describes the relationship between the number of trucks, t, and the number of cars, c, that can be serviced at an automobile shop on a given day. If the business services 16 trucks on a given day, how many cars can it service on this day?

$$34c + 52t = 1{,}070$$

(1) 8. John and Matt each ordered food at their favorite restaurant in Italy. The price of John's meal was y dollars and the price of Matt's meal was \$6 more than John's meal. Since John is nice, they split the cost of the meal evenly. There was no tip or sales tax. Which of the following expressions represents the amount, in dollars, each of them paid?

A) y
B) $y + 6$
C) $y + 3$
D) $2y + 6$

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9. James, Danny, and John all own stock in an oil company. James owns 40 shares, Danny owns 35 shares, and John owns 28 shares. If the value of one share is $7, what is the value of all of their shares combined? (1)

A) $441
B) $476
C) $721
D) $796

10. Debbie's Cupcake Company serves an average of 146 people each day in 2020. This is 12 less than half the average number of customers the company served each day last year. How many customers did Debbie's Cupcake Company serve on average every day last year? (2)

11. Jamie makes pies and cookies. It takes her 20 minutes to make a pie and 30 minutes to make a tray of cookies. This weekend Jamie is going to spend 8 hours making pies and cookies. She will make twice as many trays of cookies as pies. How many trays of cookies will she make? (2)

A) 6
B) 8
C) 10
D) 12

12. A farmer wants to buy horses and cows. The farmer has a budget of $17,000 and wants to buy at least 13 animals. The price of each horse is $1,800 the price of each cow is $1,100. What is the maximum number of horses that can be purchased? (3)

13. The product of 2 positive integers is 84. The smaller integer is one more than one half of the greater integer. What is the smaller integer? (3)

A) 5
B) 6
C) 7
D) 12

14. Acme Company manufactures sticks of dynamite. This week, Acme Company manufactured 63 more sticks of dynamite on Monday than on Tuesday. If a total of 873 sticks of dynamite were manufactured on Monday and Tuesday, how many sticks did Acme Company manufacture on Tuesday? (2)

A) 400
B) 405
C) 468
D) 810

15. Danny earns $8.50 per hour for the first 40 hours each week and 1.5 times as much for every additional hour he works. If Danny made $505.75 last week, how many total hours did he work? (3)

16. Nimi created a scale model of a train where 1 centimeter on the model equals 5 meters on the train. The length of the model train is 7.6 centimeters. Nimi wants to make a new model where a scale of 1 centimeter on the model equals 10 meters on the train. Which of the following best describes how the length of the new model train will compare to the length of the first model train? (4)

A) The length of the new model train will be 10 centimeters longer than the length of the first model train.
B) The length of the new model train will be 10 centimeters shorter than the length of the first model train.
C) The length of the new model train will be $\frac{1}{2}$ as long as the length of the first model train.
D) The length of the new model train will be 2 times as long as the length of the first model train.

17. Woody the woodchuck can chuck at least 13 logs a day and at most 19 logs a day. Willy the woodchuck can chuck at least 7 logs a day and at most 16 logs a day. Based on this, what is a possible number of days it would take Woody and Willy to chuck 175 logs? (3)

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(3) 18. A regional train company sells a monthly pass for $275. Tickets for individual trips cost $7.75, $13.50, or $17.50, depending on the length of the trip. What is the minimum number of trips per month for which a monthly pass would cost less than purchasing individual tickets for trips?

(3) 19. An industrial printer is loaded with 32,000 sheets of paper. The machine starts a large job and prints at a constant rate. After 12 minutes, the printer has used 5% of the paper. Which of the following equations models the number of sheets of paper, p, remaining in the printer h hours after the printer started printing?

A) $p = 32{,}000 - 1{,}600h$
B) $p = 32{,}000 - 8{,}000h$
C) $p = 32{,}000(0.05)^{\frac{h}{5}}$
D) $p = 32{,}000(0.95)^{\frac{h}{5}}$

(4) 20. The area of a rectangular rug is 88 feet. The rug's length x, in feet, is 7 feet shorter than its width. Which equation represents this situation?

A) $x^2 - 7 = 88$
B) $x^2 - 7x = 88$
C) $x^2 + 7 = 88$
D) $x^2 + 7x = 88$

(3) 21. Johnny's transport company has a ferry with a weight limit of 35,000 pounds. The ferry is already carrying 13,050 pounds in shipments when it arrives at the dock. If each additional crate weighs 750 pounds, what is the maximum number of new crates that the ferry can transport?

(4) 22. A cruise ship has a total of 480 rooms, and on a certain morning, one quarter of the rooms are cleaned. There are 15 housekeepers on duty on the cruise ship that morning, and each housekeeper cleans the same number of rooms, r. Which of the following equations represents the information given in terms of r?

A) $4(15r) = 480$
B) $\frac{1}{4}(15r) = 480$
C) $4(r + 15) = 480$
D) $\frac{1}{4}(r + 15) = 480$

(4) 23. The Jones family is throwing a huge surprise party for their grandfather's 80th birthday. The birthday party costs $18,000. All the family members agree to split the cost of the party equally. When 3 members of the family later refused to pay for the event, the remaining members of the family each had to pay an additional $1,000. How many family members were initially going to split the costs for the party?

(4) 24. To build a new field, a certain number of companies are going to donate a total of $250,000. Each company will donate the same amount of money. Right at the deadline, 5 more companies decide to donate, and, as a result of the additional companies, each company will pay $2,500 less. How many companies were initially going to donate to pay for the field?

(4) 25. A rectangular area consists of 1,372 equal squares where each square has an area of k. If the width of the rectangular area is 1.75 times the length and the length is equal to $x\sqrt{k}$, what is the value of x?

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