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ABSTRACT

This collection of mathematics word problems was developed by adult learners in the Reach One Program. The first page describes the steps that led to the finished product: having learners work word problems; listing steps for solving word problems; having learners work problems according to these steps; providing a list of key words that indicate what arithmetic processes are needed; having learners work in groups to solve cloze-style word problems; having learners write word problems; editing, reviewing, and revising learners' word problems; arranging them into an ordered collection; choosing a title; and publishing and distributing the resulting collection. The steps needed to solve word problems are listed. The booklet contains 31 word problems that require use of arithmetic operations (addition, subtraction, multiplication, and division) to solve problems related to daily experiences, such as purchasing goods, wages and earnings, and interest. Solut to problems are provided. (YLB)

REACHING FOR SOLUTIONS

Math Word Problems

by

The Members of The Reach One Program

Peg Levine, Ph.D., Instructor

Columbus, Ohio
1991

The Ohio State University/Columbus Public Schools
Reach One Program
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Writing Math Word Problems: A Publishing Project
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1. Begin by having learners work one or two word problems appropriate to their math/reading levels.

2. List on the board or in a handout the steps for solving word problems, such as:

   A. Identify the question in the problem and "determine what the question is asking."
   B. "Decide what information is necessary. . .to solve the problem"; watch out for red herrings.
   C. "Decide what arithmetic operation to use."
   D. "Work out the problem and find the solution. Check. . .arithmetic!"
   E. Check the answer against the question asked in the problem.

   (Tamarkin 1)

3. Learners should work their next problems according to these steps. If a handout of the steps is used, leave spaces between steps to emphasize the steps of problem solving as well as the writing involved in this project.

4. Provide a list of "key words" used to indicate what arithmetic processes are needed (Tamarkin chaps. 2-4). Learners should be given copies of word problems so they can underline these words as part of the problem solving process. This can also be presented as a vocabulary exercise.

5. If possible, form pairs or small groups to solve word problems in which some words have been omitted (but not key words). In this cloze style activity, any sensible word choice is acceptable. This exercise combines attention to careful reading and computing.

6. Learners should create a list of vocabulary words they can use in their own word problems. One productive source for this list would be learners' jobs.

7. Reconsider steps to solve word problems in light of writing problems. Adjust the steps as needed; for example, instead of beginning by trying to write the question, begin by brainstorming or mapping for data on which to draw. See if the words on the above vocabulary list suggest situations that could be used for problems.

8. Together with learners, create a relevant word problem as a model, perhaps one based on a classroom situation.

9. Learners can work individually, in pairs, or small groups to write and solve their first word problems. In solving the problems, make sure that everyone writes out each computational step involved in the solution.

10. Check to see that word problems written are appropriate to their skills; encourage them to write problems that will challenge their classmates who will be asked to solve these problems.

11. Learners should exchange word problems to edit for content, language use, and math; also review to see if questions are clear and sensible and the necessary information is present.

12. Ask learners to write their best and favorite word problems with the problem stated on the top half of a sheet of paper and on the bottom half the solution. The solution should include every step of the processes needed to solve the problem. If necessary, explanations can also be written in sentence form.

13. Collect learners' word problems and edit with minimal marking to encourage learners to do their own proofreading and corrections. Review their corrections with them. Repeat editing and revising as needed.

14. If a word processing lab is available, schedule time for learners to type their own problems using the divided page format.

15. Make photocopies of problems so that each learner has a set of problems to solve. Learners should compare and elicit editorial help to further clarify problems and, later, solutions. Help with final editing, as needed.

16. Have individuals go through the full set of problems and classify them by level of difficulty and/or math processes.

17. As a large group, compare classifications and determine the order in which the problems will appear.

18. Share ideas from individual brainstorming on possible titles. Choose a title by vote.

19. Publish and distribute.

Work Cited:

Tamarkin, Kenneth. Number Power 6: Word Problems. Chicago: Contemporary Books, 1983.

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Steps to Solve Word Problems

1. What question is the word problem asking?

2. What information is <u>necessary</u> to answer the problem? Avoid "red herrings."

3. What arithmetic operation(s) should be used and what "key words" are used to indicate the math needed?

4. Solve the problem and double check the math.

5. Explain how the solution answers the problem's question.

PROBLEMS

1. How much did John spend on dinner when the food cost $40 and the tax was $2.00?

Pearl Jones

2. She bought a car for $1100. He bought a truck for $500. How much did they spend all together?

Charles Angus

3. My gas bill was $50 this month and last month it was $48. How much did I save last month?

Pearl Jones

4. I spent $46 on gasoline last month for my 5 year old car. This month I have spent $37. How much did I spend on gasoline during the 2 months?

Pearl Jones

5. Ann Smith sold a dress to Kitty. The dress cost twenty dollars. She sold her a hat that cost six dollars too. A man walked in the store then. How much money did Kitty spend at the store on Sunday?

Ed Galloway

6. Warren has 3 trucks. He gives each driver $30.00 for gas. How much did Warren spend for gas?

Virginia Skiver

7. Joe has to stock a utility room and he has to have the following:

3	catheters
3	22 gauge Angiocaths
3	20 gauge Angiocaths
3	23 gauge Angiocaths
3	of D545 20k
3	of D545 1000 ml
3	of D.09 1000 ml
3	of D5W 1000 ml

What is the total of the items?

Then a nurse calls and said she has to return 3 IV's to the utility room. What's the total after the return?

Tim Reeves

8. J.R. had 14 trucks that he wanted to sell. But he sold 13 trucks instead of 14 trucks. Then a friend bought 1 truck off of him. The G.M.C. car company wanted to sell him 10 G.M.C. cars. How many trucks did he have left over?

Ed Galloway

9. Billy went to work. The car miles were 5095. Then he went to the store, it was 15 miles. Then he stopped at his mother's house, 18 miles. Then he went 11 miles home. What was his total on the odometer?

Chris Bowman

10. In this house there are windows. There are 3 in the bedroom, 2 in the living room, 2 in the dining room, and one in the kitchen. How many windows are in this house?

She has 2 pairs of curtains for the living room and one pair in the kitchen. How many more pairs of curtains will she need to buy?

Creasie Holton

11. Jim Bob and Billy Ray are going on a three day fishing trip. They will be going to Lake Whip-E-Wow in Frostbite Falls, Minn. They both agreed to share the cost equally. Cabin rental will cost $50.00 a day, food $60.00, beer $75.00, bait $30.00, and boat rental $20.00 a day. How much did Jim Bob and Billy Ray each spend equally?

Harry Taynor

12. If there are eighteen cars on a lot and each car has four seat belts and there are nine trucks each with two seat belts, how many seat belts all total?

Jay Hollis

13. Carol bought three cases of dog food at 8.39 a case. The next week the store had dog food for 7.63 a case and she got 2 more. What was the total for the five cases? How much less did she pay for the last two?

Wanda Hay

14. Pat has to buy 20 mirrors for the house she was decorating. Three of the mirrors she bought cost 25.00 each and the other 17 mirrors cost 35.00 dollars a piece. How much did she spend for the total amount for the mirrors?

Donna Barger

15. Jane was working for 39 hours the first week. The second week she was working 28 hours at $4.50 an hour. How much did she make?

Tom Cooper

16. The windshield in this car got broken and it cost ten dollars an hour for labor to replace it. It took five hours. The windshield cost $100. How much did it cost in all to put it in?

Calvin Spradlin

17. The church had a bake sale. They are selling whole pies for $6.40 each. There are eight slices to a pie. Mary wanted to buy one slice of pie. How much did Mary pay for the slice of pie?

Virginia Skiver

18. A woman comes to work at 3:00. It takes her 15 minutes to get to her building. It takes her 15 more minutes to start to work. She takes her first break at 5:00 to 5:15 and a lunch break at 7:00 to 7:30 and another break at 9:00 to 9:15. It takes her 15 minutes to get to the time clock. In an 8 hour day, how many hours did she actually work?

Larry Haddox

19. There are 6 employees working on a job. 5 of the employees work 4 hours a day. 1 of the employees works 4 1/2 hours a day. What is the total number of hours worked in 10 days?

Danny Radcliffe

20. Will goes grocery shopping once a week. Last month Will spent $85.73 the first week.

$59.36 the second week
$72.25 the third week
$67.49 the fourth week

What was Will's average weekly grocery bill?

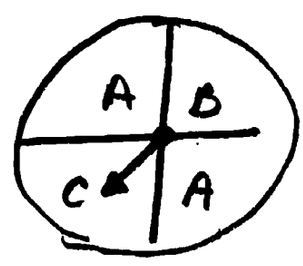
Wayne Tyler

21. Carol weighed 198 pounds. She wants to lose 45 pounds. She has lost 22 pounds by Christmas. During Christmas she gained 1 3/4 pounds back. What is the total of weight she has lost? What is the total weight she has to lose?

Wanda Hay

22. If you spin the spinner, what is the probability that it will stop on an A section?

Jim Sims



23. There are twenty electricians and forty assistant electricians in a shop of sixty workers. What would be the percentage of assistant electricians in the shop if ten of them were to transfer?

Terryl Davis

24. Joe has seven chalkboards at work which he cleans daily. Each chalkboard needs 2 1/2 pieces of chalk per day, every day of the week. How much chalk will Joe use in a week?

Jerry Sexton

25. Part One:

I have a ready reserve checking account. I have $300 in reserve, I've got $224 in my checking account. I receive my gas bill which is $254. I wrote a check to pay the bill. How much am I using out of my ready reserve?

Part Two:

I am going to deposit $85 in my checking account, but I must put back what I took out of my ready reserve. How much do I have left in my checking account now?

Phyllis Charles

26. (A) We had 300 pounds of freon in stock. The cost of the freon was $1.75 a pound. What was the total price of the freon when we bought it?

(B) Now the cost went up to $5.00 a pound. How much difference did we save per pound by buying it before the price went up?

(C) What was the total saving on 300 pounds?

Ronald Matthews

27. Here is a room that is 15 feet wide by 15 feet long. I want to replace the floor in that room. I would be using 12 x 12 inch tile on the floor in that room. The tile comes in 45 square feet per box. Tell me how many boxes of floor tile will need to do that room?

Ed Galloway

28. Part A: A hardware store bought 12 claw hammers wholesale for $107.40. What was the cost of each hammer?

Part B: The following week he put the hammers on sale for 12.00 each. What was the total markup?

Part C: What was the profit on 8 hammers?

Part D: 7 days later he reduced 4 hammers by 10% and sold them. How much money did he make?

Jim Love

29. James' earnings are $856.00 every two weeks before tax and insurance. After tax and insurance James brought home $619.21.

A. How much tax and insurance does Personnel take out?

B. What is James' hourly pay?

C. How much does James earn in four weeks?

D. How much does James bring home in four weeks?

E. How much does James gross per year?

J. R. Whaley

30. Joe had a contract to unload and plant one truck-load of flowers per day for five days.

(A) What was the cost per day and

(B) Total cost for five days when the flowers cost $1,500 per load, the truck rental is $100 per day, and the labor at the site is $270 per day?

When Joe finished he added 20% to the total for his profit.

(C) What was the total amount of the bill given to his customer?

Joe Barnett

31. Bob borrowed $5,000.00 from a Bank One at 11% simple interest for forty-eight months.

A. What are his monthly payments without interest and with interest?

B. What is the total he will pay at the end of 48 months?

Mike Hodge

SOLUTIONS

1. $40 + $2 = $42

2. $1100 + $500 = $1600

3. $50 - $48 = $2

4. $46 + $37 = $83

5. $20 + $6 + $10 = $36

6. $30.00 x 3 = $90.00

7. 12 + 12 = 24

   24 + 3 = 27

8.
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   14   for sale
 - 13   sold
   01
 - 01   friend
   00
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9. 15 + 18 = 33 + 11 = 44 5095 + 44 = 5139

10. 3 + 2 + 2 + 1 = 8

    8 - 3 = 5

11.

Cabin rental	$50.00 x 3 =	$150.00
Food		60.00
Beer		75.00
Bait		30.00
Boat rental	$20.00 x 3 =	60.00
		$375.00

$375.00 ÷ 2 = $187.50

12.

Total cars	18 x 4 = 72
Total trucks	9 x 2 = 18

Total: 72 + 18 = 90

13. 8.39 x 3 = 25.17
    7.63 x 2 = 15.26
    40.43

14. 25 x 3 = $75

    35 x 17 = $595

    $595
    + 75
    $670

15. 1st week 4.50 x 39 = 175.50
    2nd week 4.50 x 28 = 126.00

    175.50 + 126.00 = $301.50 total

16. 5 x $10 = $50
    + $100
    $150

17. 6.40 ÷ 8 = 80

18. 15 + 15 + 15 + 15 = 60 + 30 = 90 minutes
    1 1/2 hours

    8.0 - 1.5 = 6.5 hours worked

19. 5 x 4 = 20 + 4 1/2 = 24 1/2

    24 1/2 x 10 = $245

20. 85.73
    59.36
    72.25
    67.49
    284.83 284.83 ÷ 4 = $71.21

21. 22.0 - 1.75 = 20.25

    45.0 - 20.25 = 24.75

22. The probability of stopping on an A section is the fraction 2/4! The numerator 2 is the number of times the A can occur. The denominator 4 is the total number of sections in the circle.

23. 30 = Assistants Minus 10
50 = Total Workers

30 ÷ 50 = .60 60% Assistant Electricians

30/50 3/5 .6

24. 2 1/2 = 2.50 pieces of chalk per board
x 7 chalkboards
17.50 pieces of chalk per day
x 7 seven days in a week
122.50 pieces of chalk per week

122.50 = 122 1/2 pieces of chalk

25. In order to solve this problem, subtract $224 from $254. I am using $30 out of my ready reserve. Two days later I deposit $85. Subtract $30 from $85 that leaves $55 in my account.

26. (A) $1.75 x 300 = $525.00

(B) $5.00 - $1.75 = $3.25

(C) $3.25 x 300 = $975.00

27. Step 1 15 x 15 = 225

Step 2 225 ÷ 45 = 5 boxes

28. Part A: 107.40 ÷ 12 = 8.95

Part B: 12.00 - 8.95 = 3.05

Part C: 3.05 x 8 = 24.40

Part D: 12.00 x .10 = 1.20
12.00 - 1.20 = 10.80
10.80 x 4 = 43.20 profit

29. A. Tax and insurance is $236.79
(856.00 - 619.21)

B. His hourly pay is $10.70
(856.00 ÷ 80)

C. In 4 weeks he earns $1,712.00
(856.00 x 2)

D. In 4 weeks he brings home $1,238.42
(1,712 - 473.58)

E. His gross per year is $22,256.00
(856 x 26)

30.

Flowers	1,500	x	5	=	7,500
Truck rental	100	x	5	=	500
Labor	270	x	5	=	1,350

(A) Per day $1,870 x 5 = $9,350 (B) 5 days

(C) 9,350 x .20 = 1870.00 9,350 = 1,870 = $11,220
Total cost of contract
billed to customer

31. A. 5,000.00 ÷ 48 = $104.17

$104.17 x .11 = $11.4587

$104.17
+ 11.46 (rounded)
$115.63

B. $5,000 x .11 = $550.00