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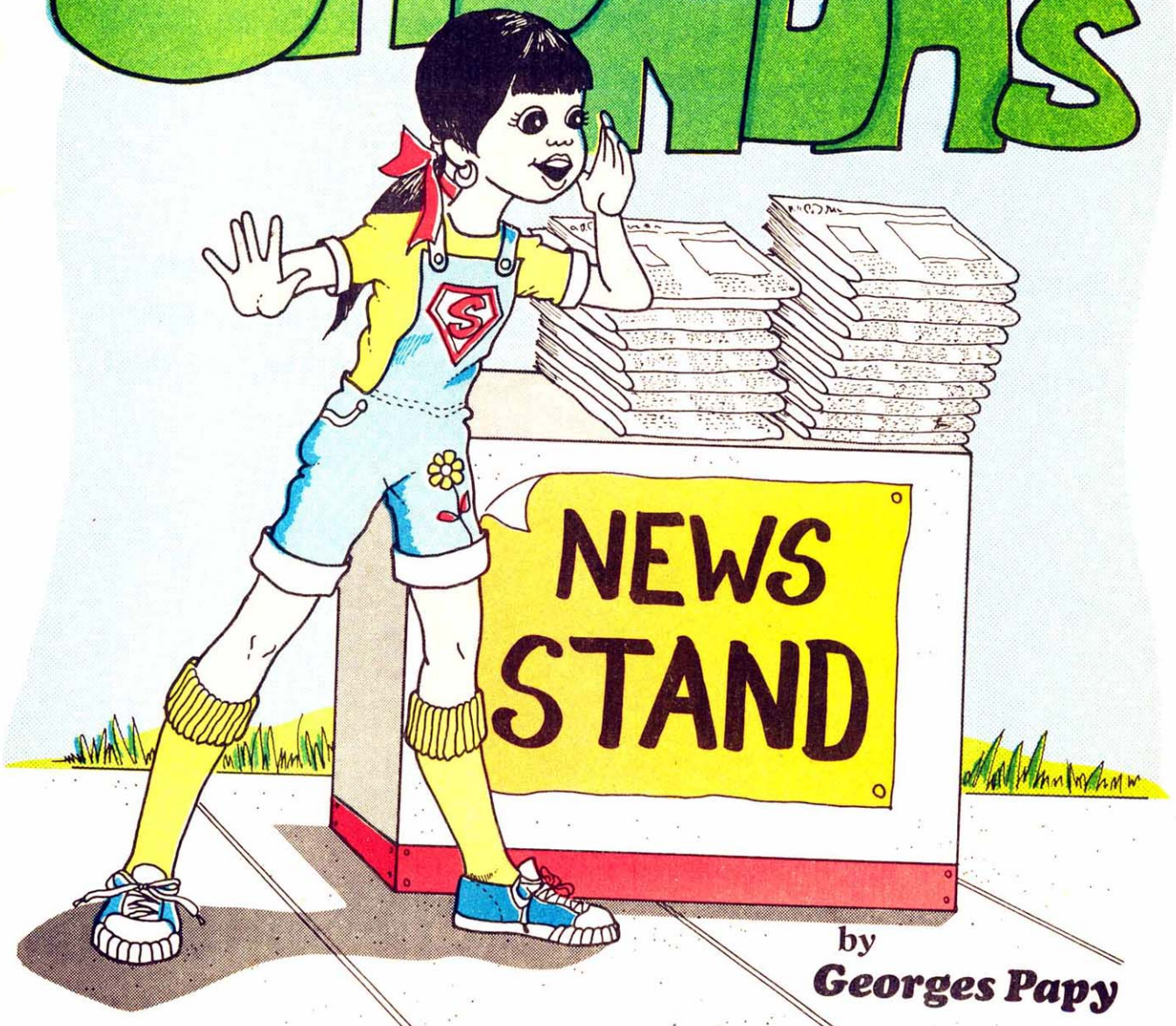
MATH STORY-WORKBOOKS

5-27101

SHUNDA's



by

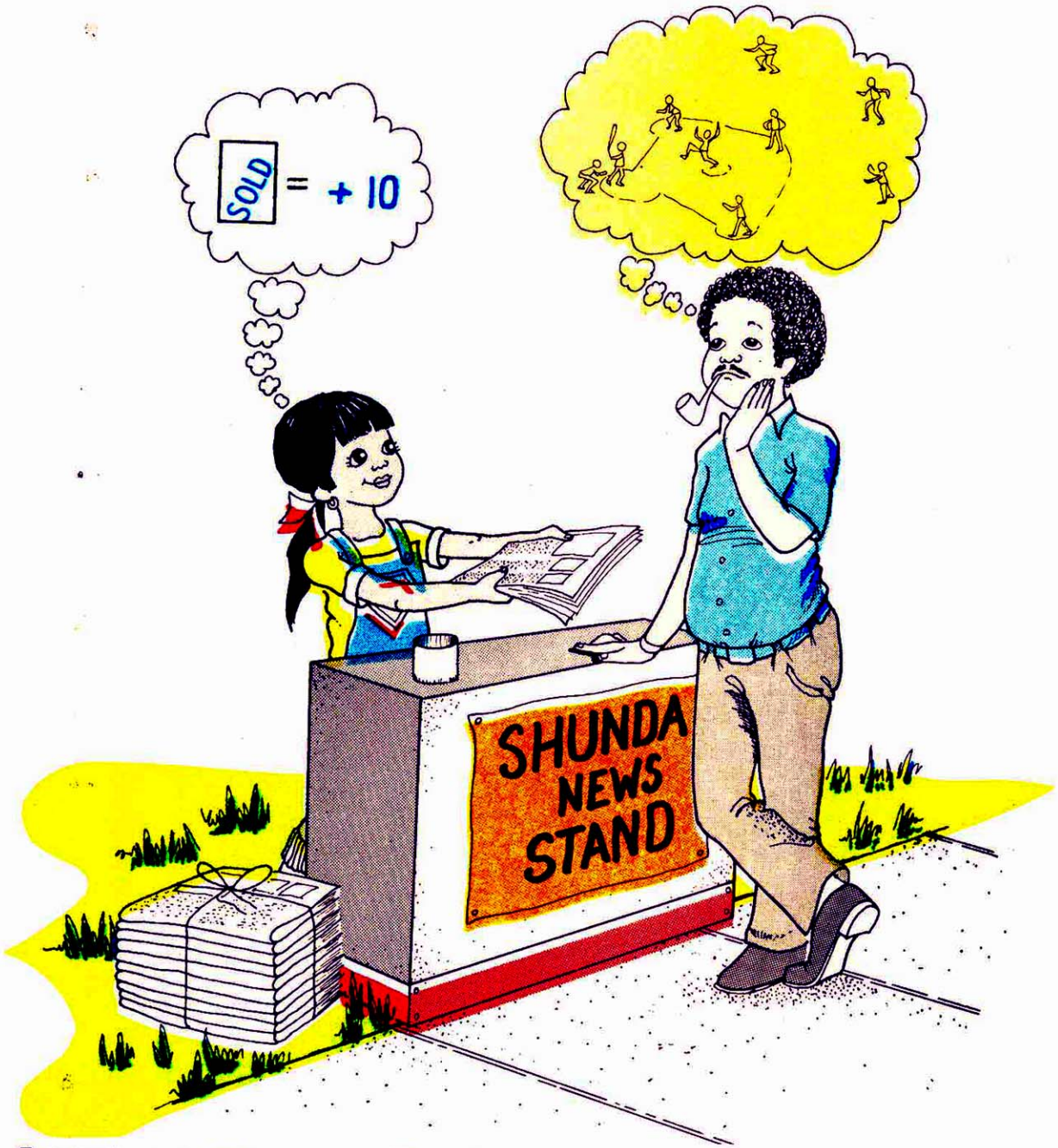
Georges Papy

Pictures / Design
Steven Sims

Shunda is a newspaper girl. Between 4:00 and 6:00 P.M. each day, she stands at the corner of Hamilton Street and Euler Avenue and sells newspapers to people passing by.

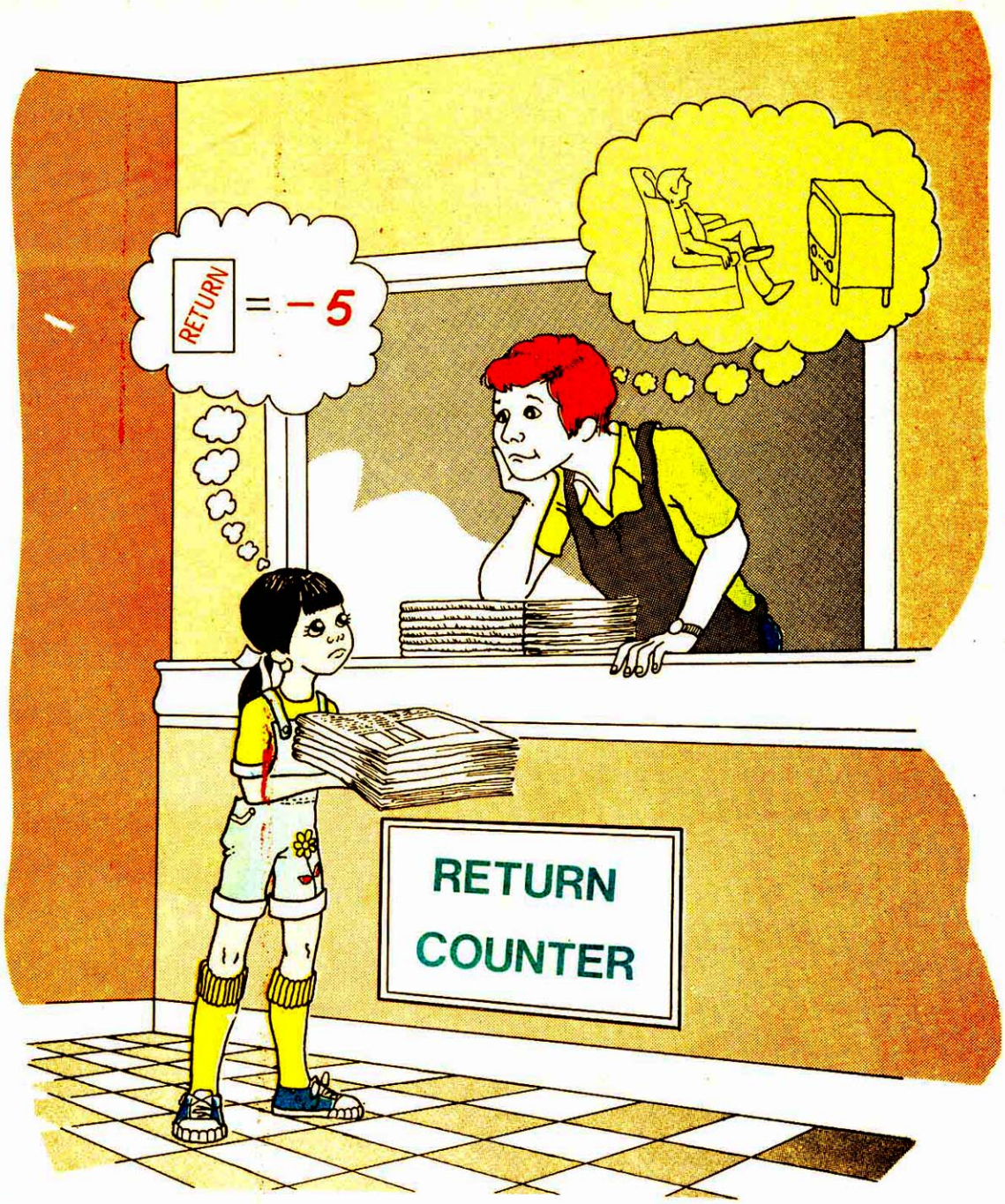
Shunda buys newspapers from a dealer for 10 cents each and she sells them to her customers for 20 cents each. Since the number of customers Shunda has varies from day to day, the dealer agrees to buy back the papers she doesn't sell for 5 cents each.

Shunda wants to have a successful business: she tries to make as much money as possible. Like any good merchant, Shunda keeps records of her business and to help do this, she makes use of symbols, shapes, and colors.



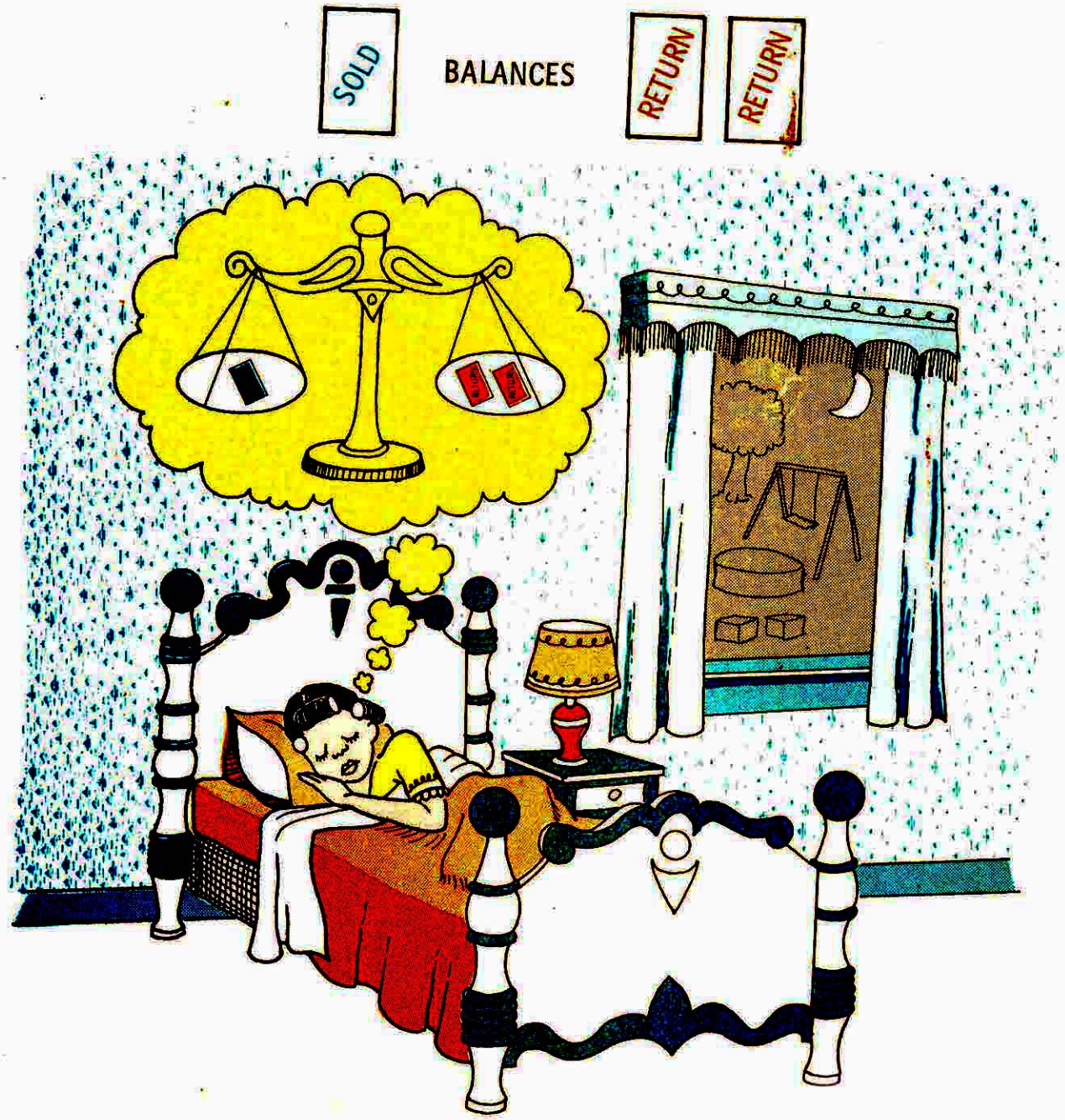
For each newspaper SOLD, Shunda makes a gain of 10 cents.

SOLD = + 10 = 10 cents gain



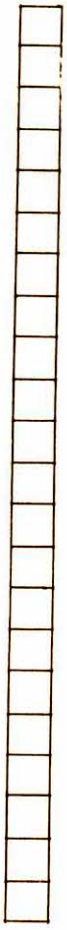
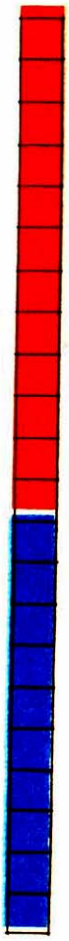
For each newspaper RETURNED , Shunda has a loss of 5 cents.

RETURN = − 5 = 5 cents loss

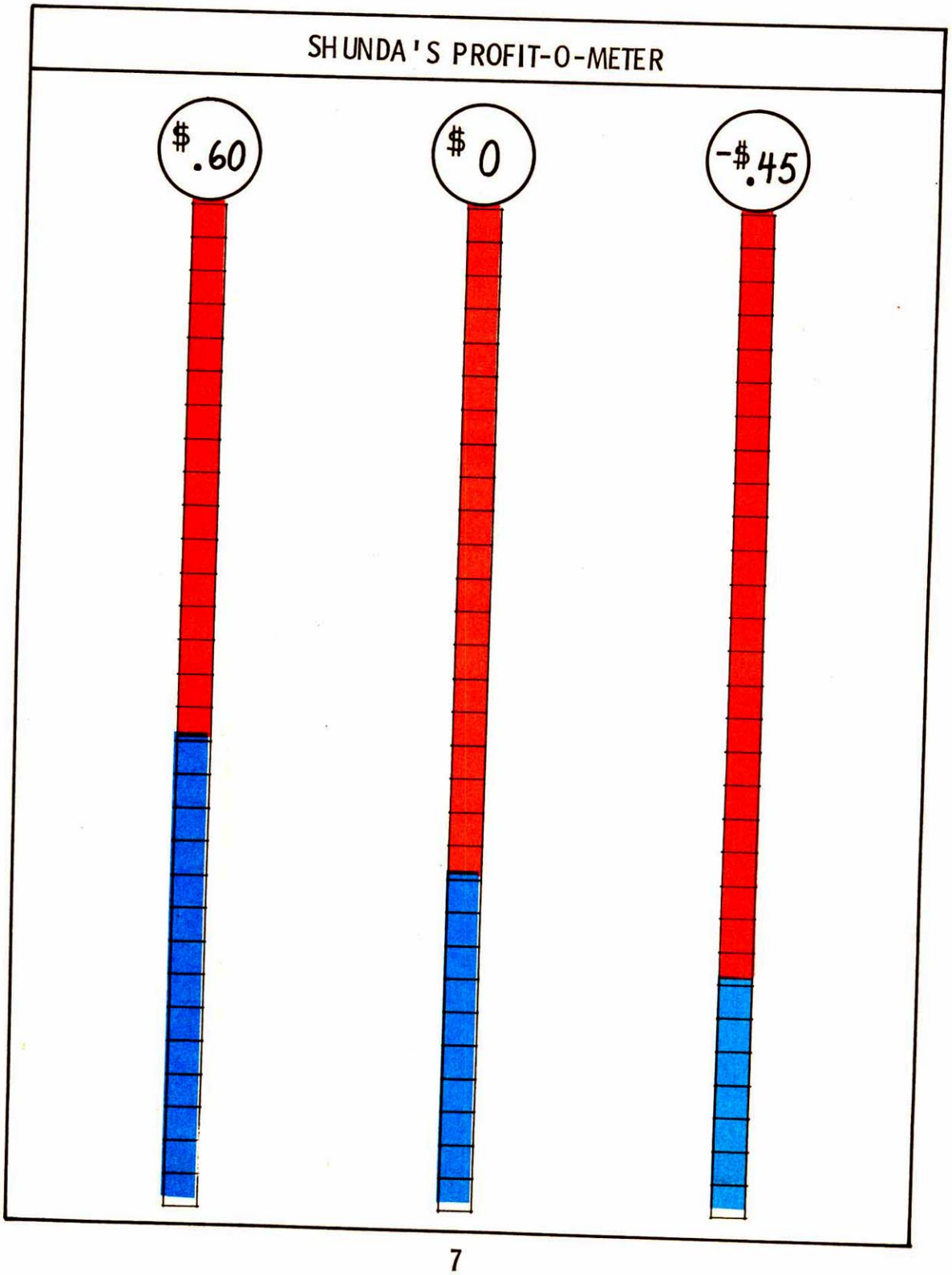


One newspaper SOLD balances two newspapers RETURNED

SHUNDA'S BALANCE SHEET FOR ONE DAY

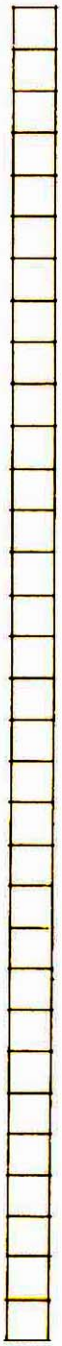
4:00 PM	6:00 PM
SUPPLY	FINAL SALES
	

SUPPLY	GAIN	LOSS	PROFIT
22 newspapers	$ 1.00	$ .60	$ .40


SHUNDA'S PROFIT-O-METER
$.60
$0
-$.45

4:00 PM

SUPPLY



6:00 PM

On Sunday afternoon, an important football game was held; the results were in the evening paper. Shunda expected many customers. She came to her corner at 4:00 P.M. with a supply of _____ newspapers.

She sold 26 papers.

Complete Shunda's Balance Sheet and Profit-o-meter.

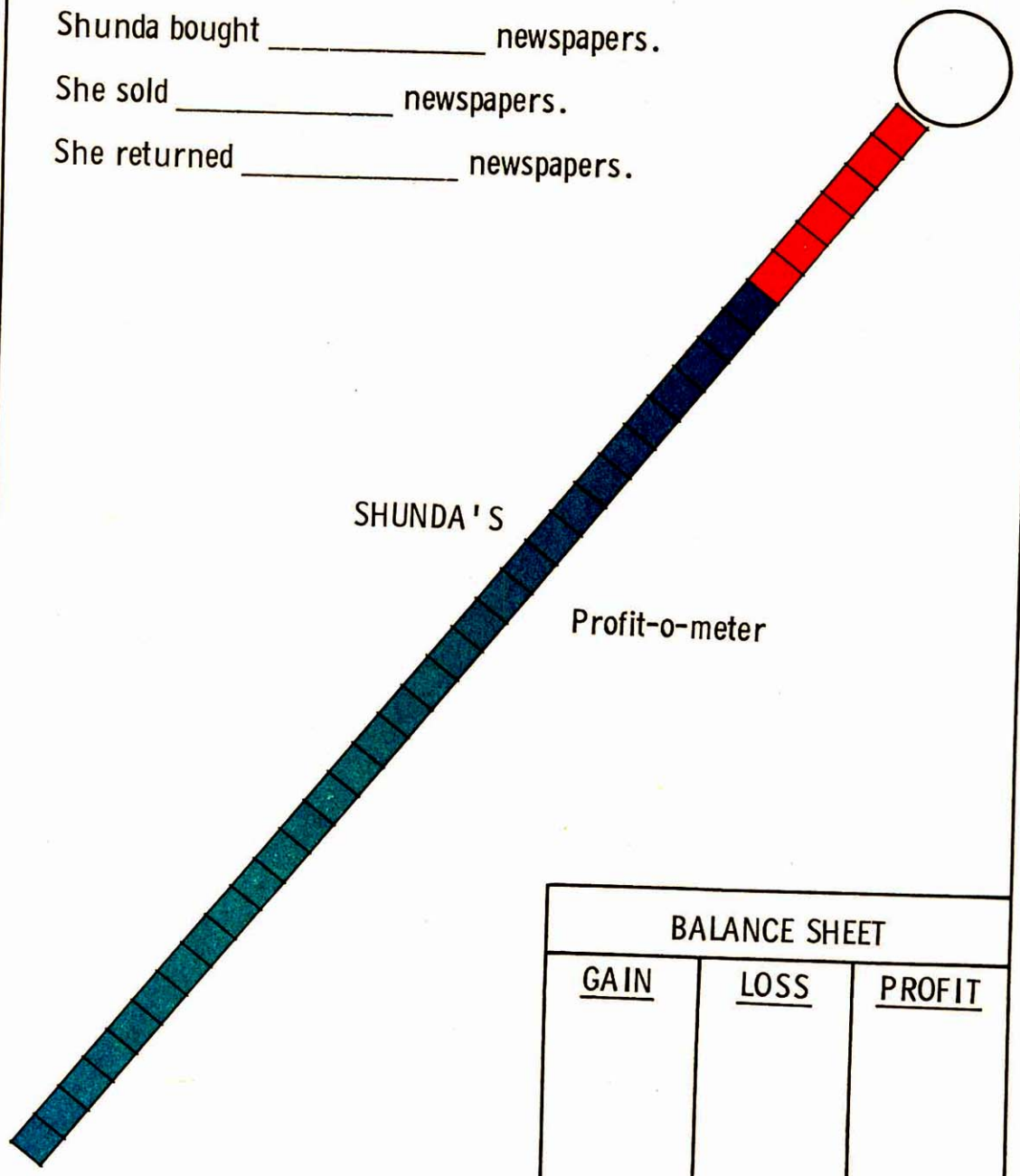
BALANCE SHEET		
GAIN	LOSS	PROFIT

ON ELECTION DAY...

Shunda bought _____ newspapers.

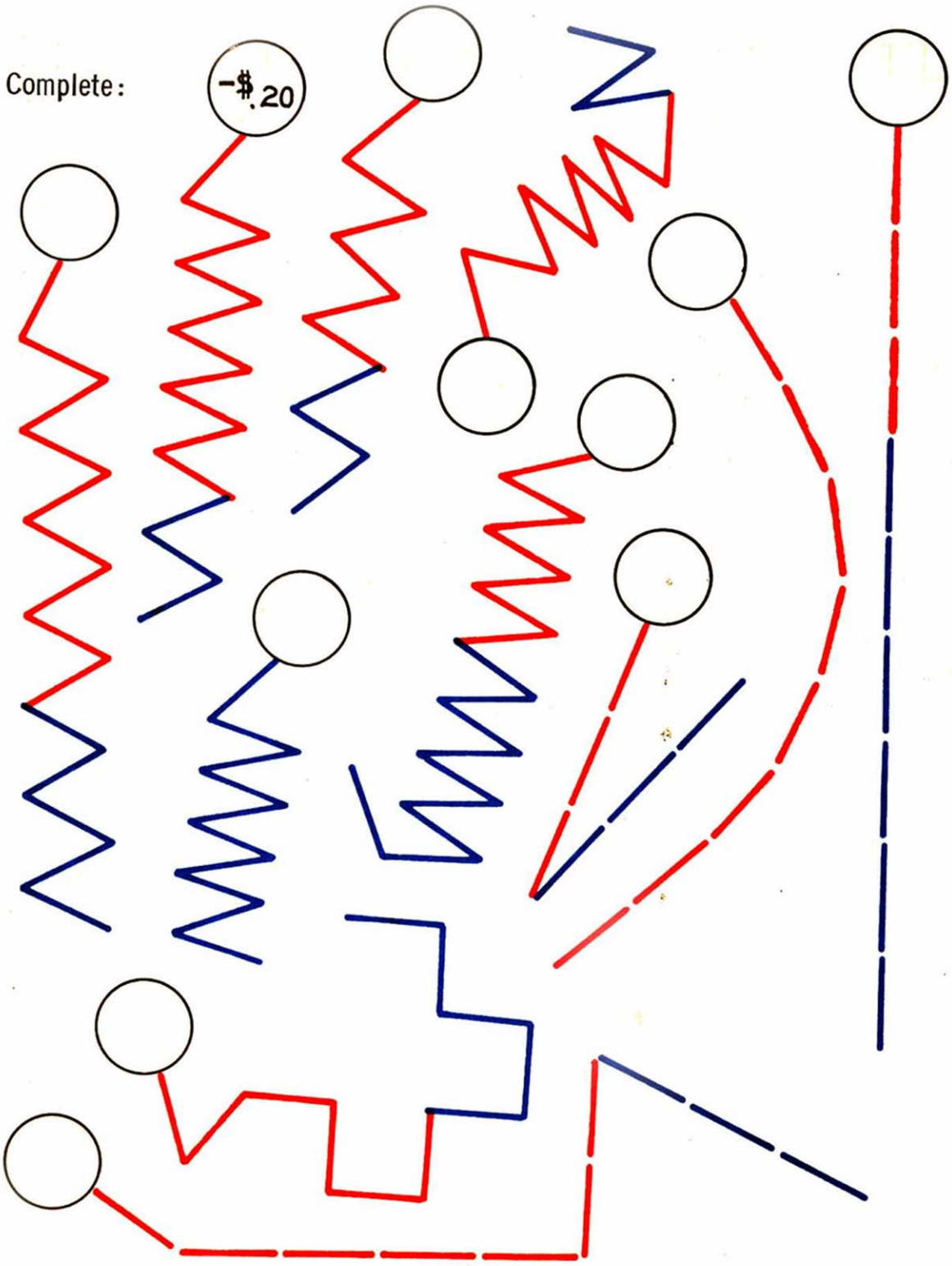
She sold _____ newspapers.

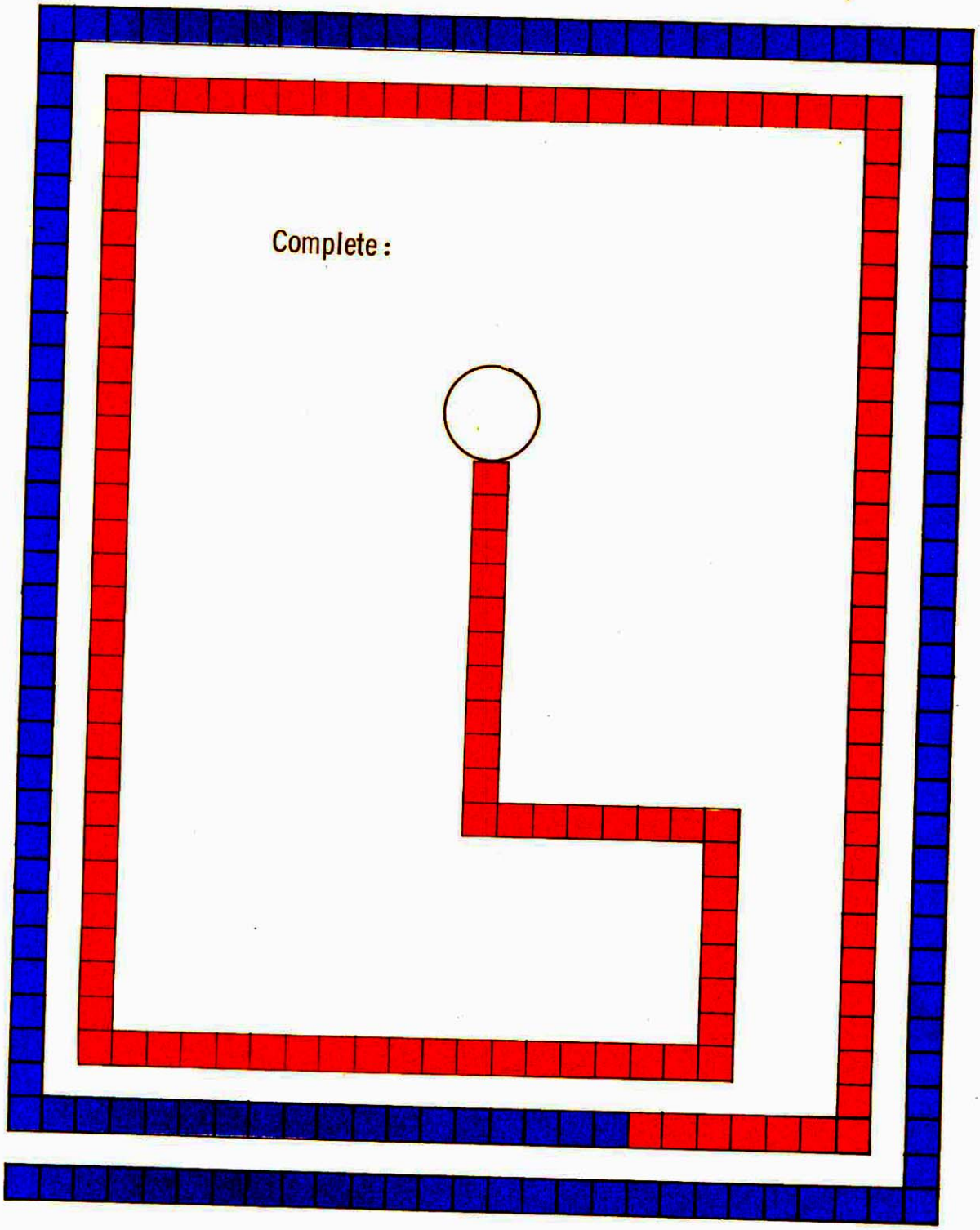
She returned _____ newspapers.



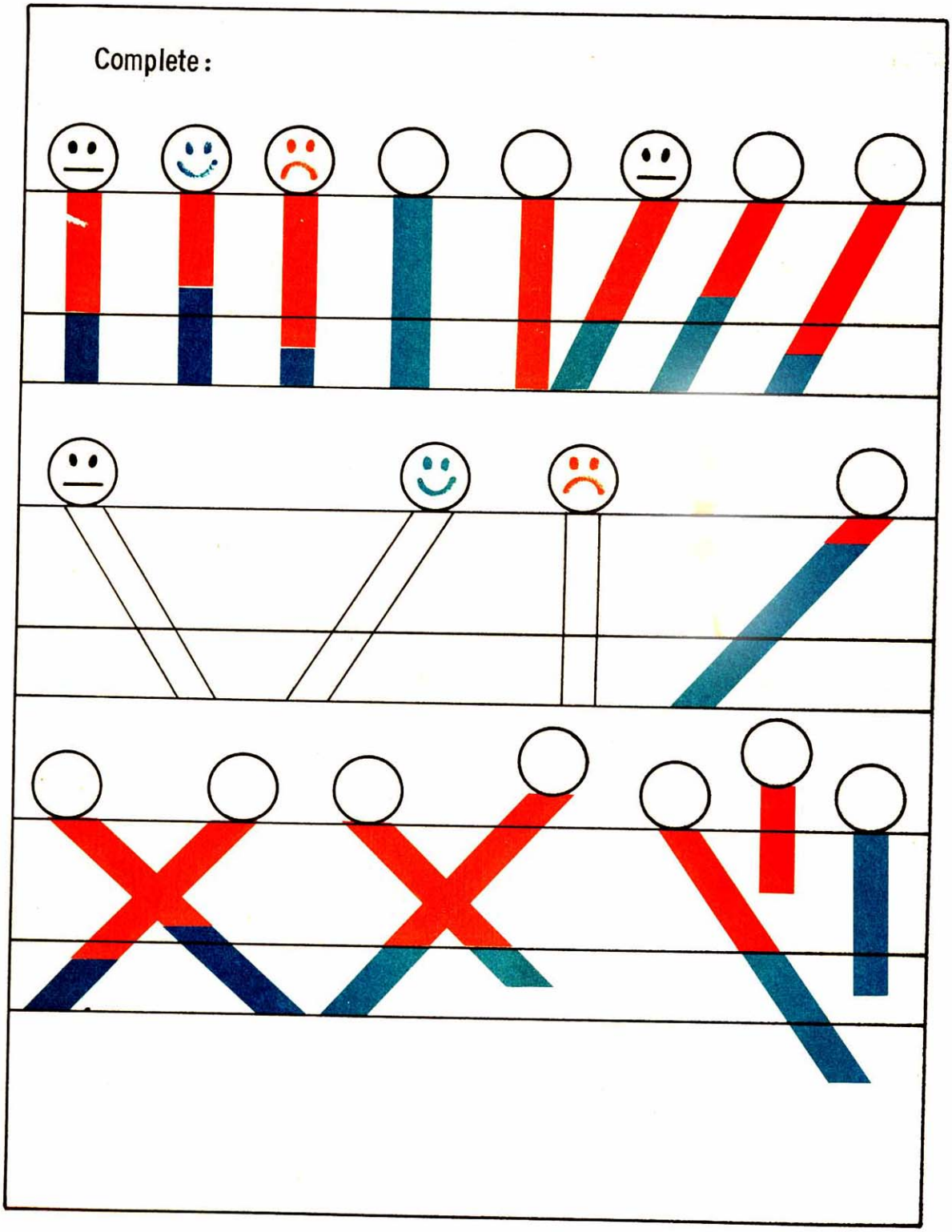
BALANCE SHEET		
GAIN	LOSS	PROFIT

Complete:

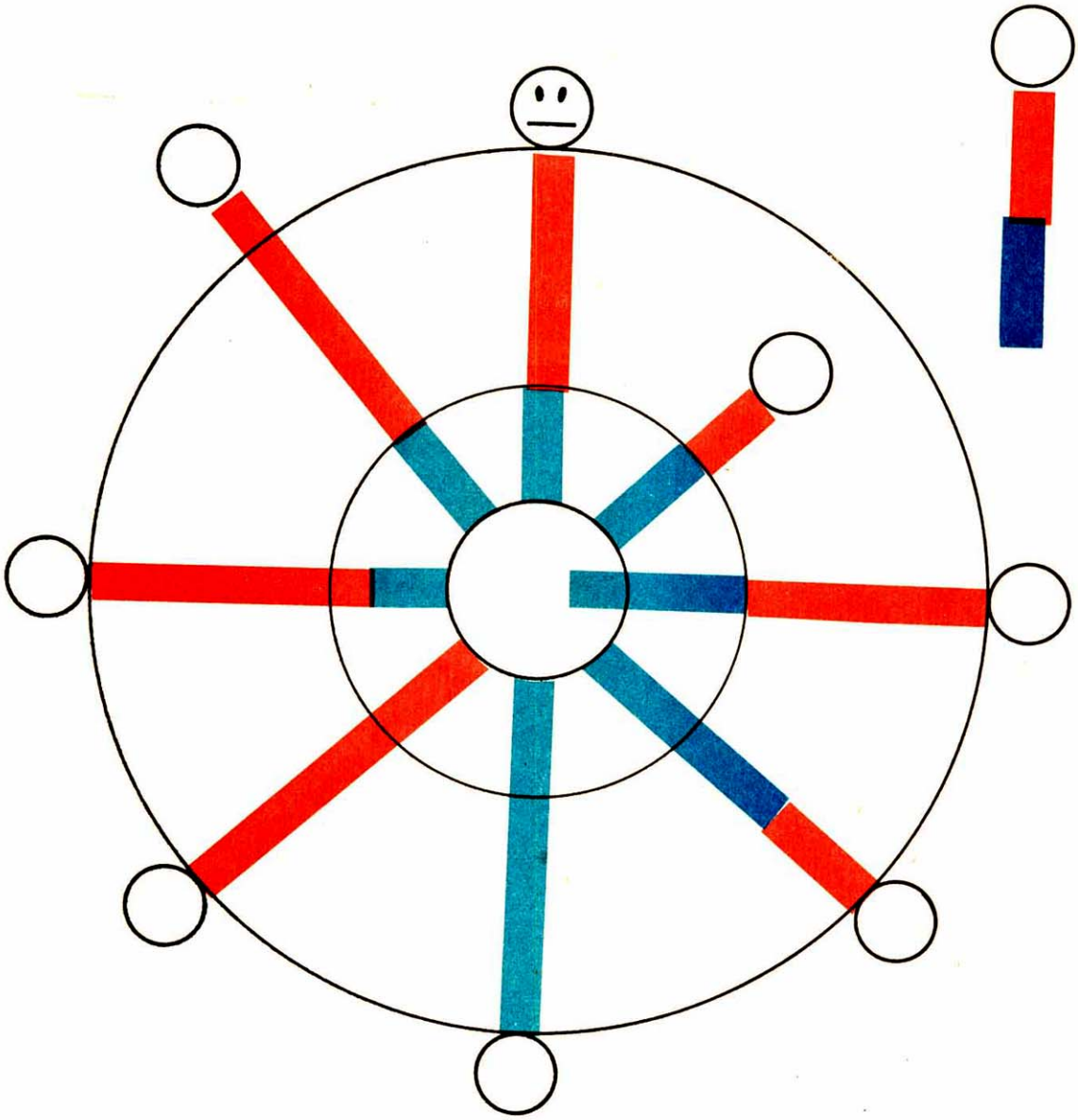



Complete :

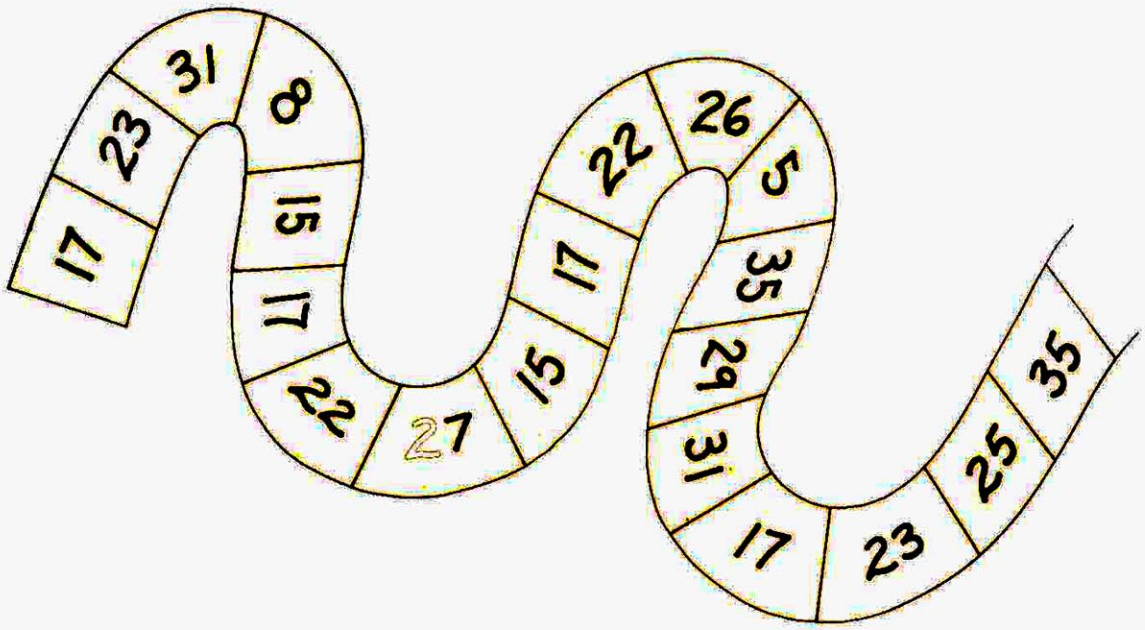
Complete :



Complete :

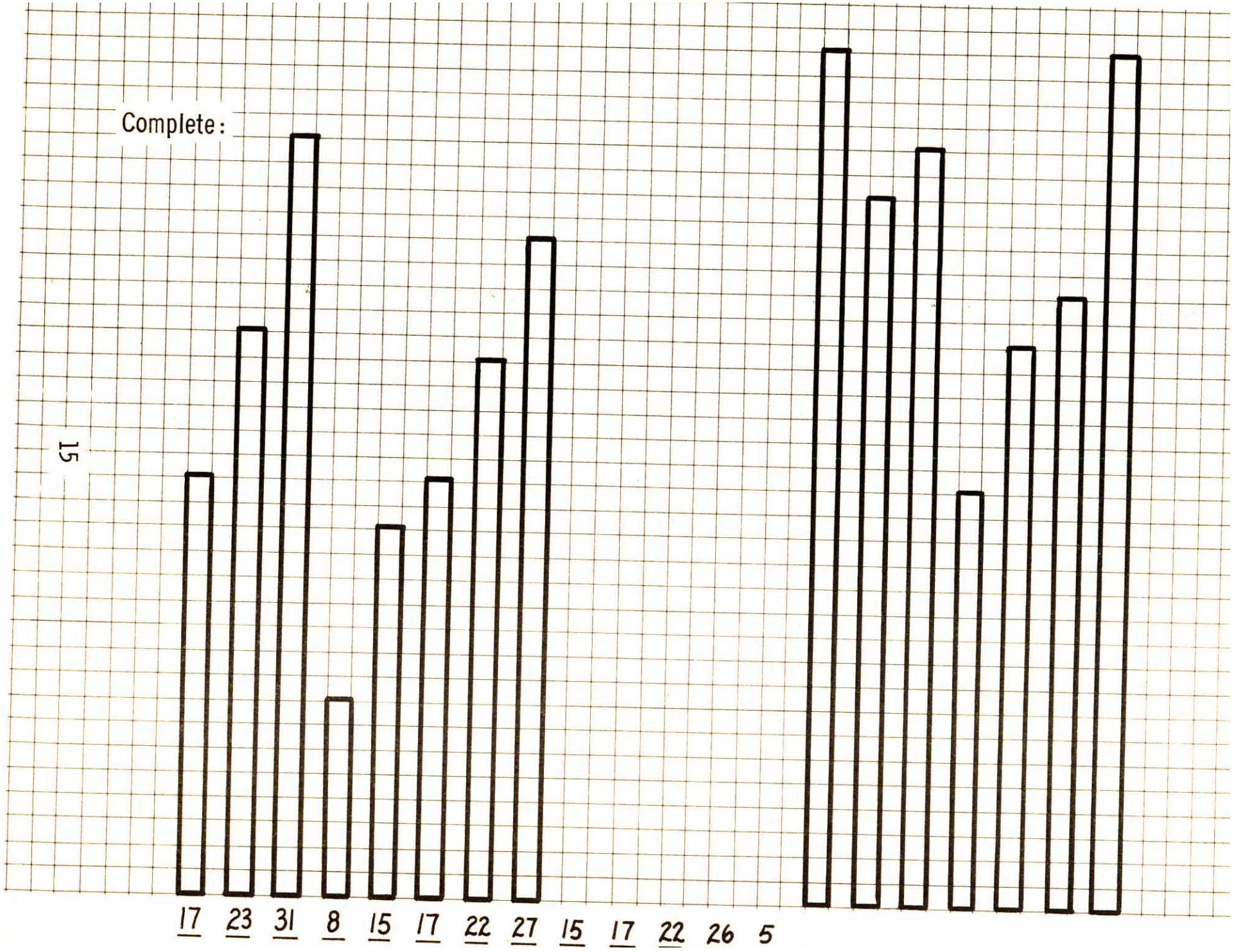


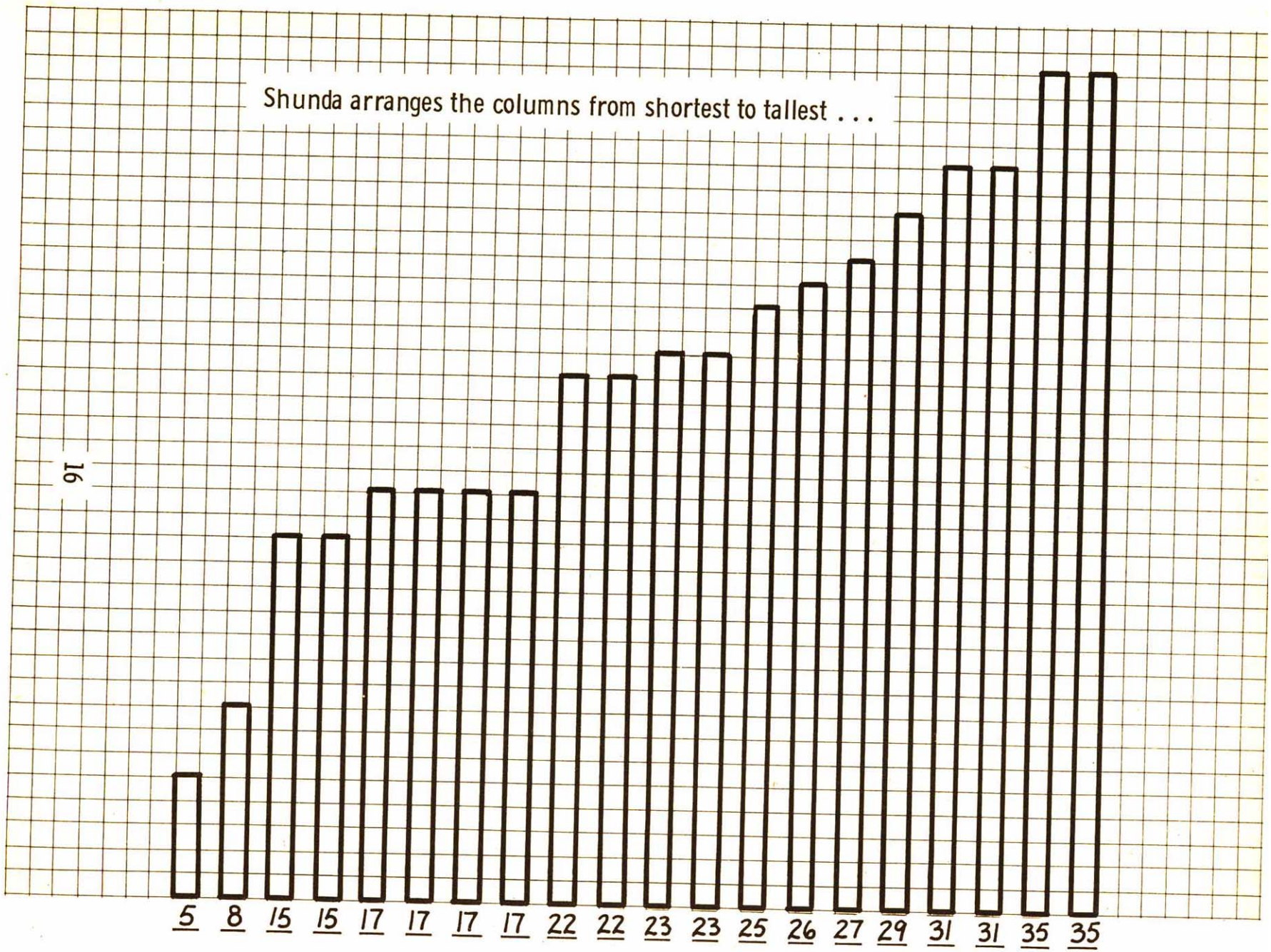
Shunda started her newspaper business as an apprentice. Her learning and training period will end November 15th. After that day, she will have to follow stricter rules and the daily supply of newspapers she buys will have to remain CONSTANT: the same number every day. In order to discover the best supply to buy from the dealer, Shunda decides to keep a record of the daily demand during an experimental 20 day period.



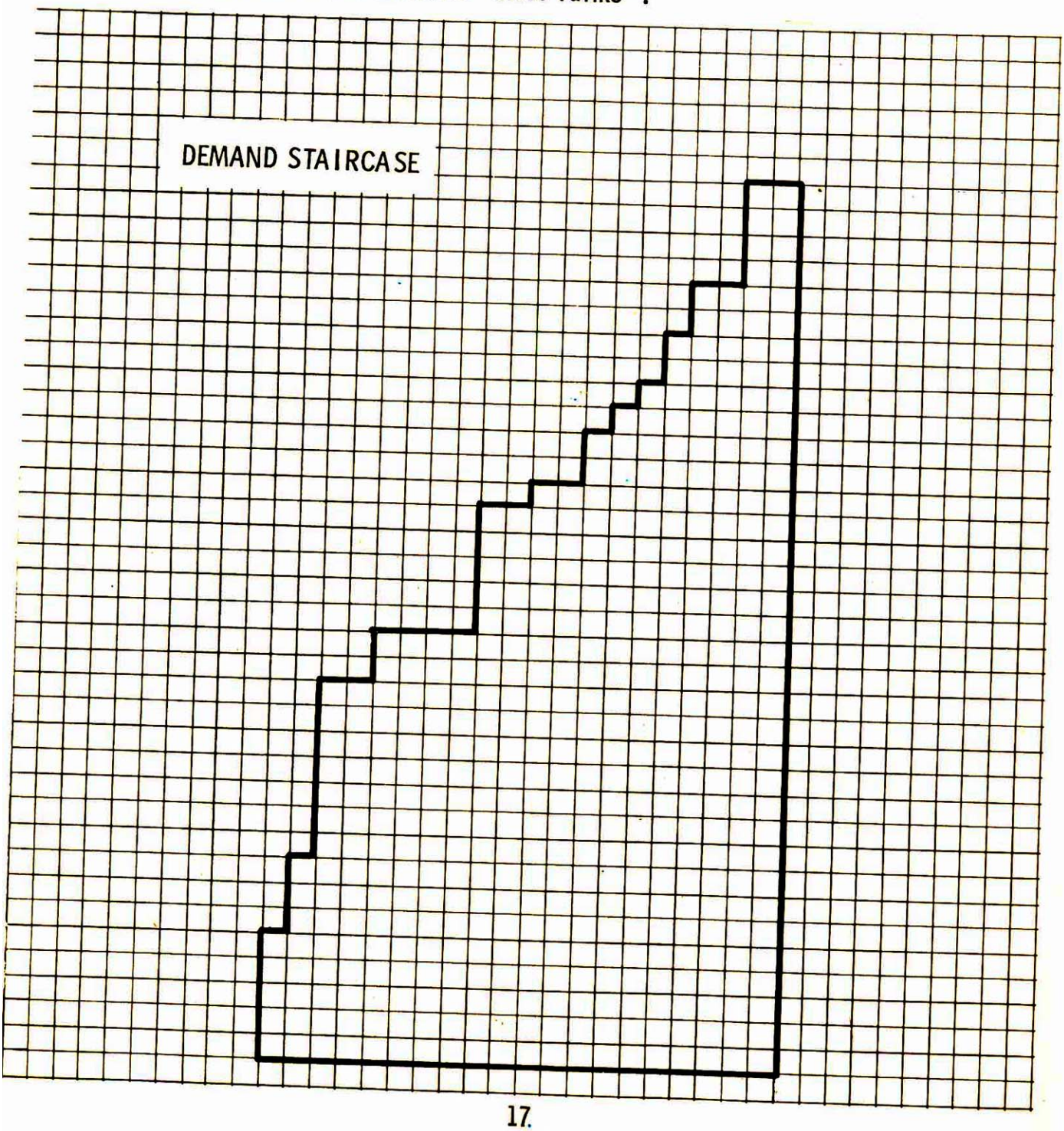
Then Shunda will determine what would have been the best constant supply during that experimental period of 20 days.

Complete:




Shunda arranges the columns from shortest to tallest . . .
16
5 8 15 15 17 17 17 17 22 22 23 23 25 26 27 29 31 31 35 35

. . . and then has the columns "close ranks".



The largest demand during the 20 day experimental period was 35. Suppose Shunda would decide on a constant daily supply of 35 newspapers.

Page 19 shows the record (profit-o-meter) for the 20 day experimental period

IF

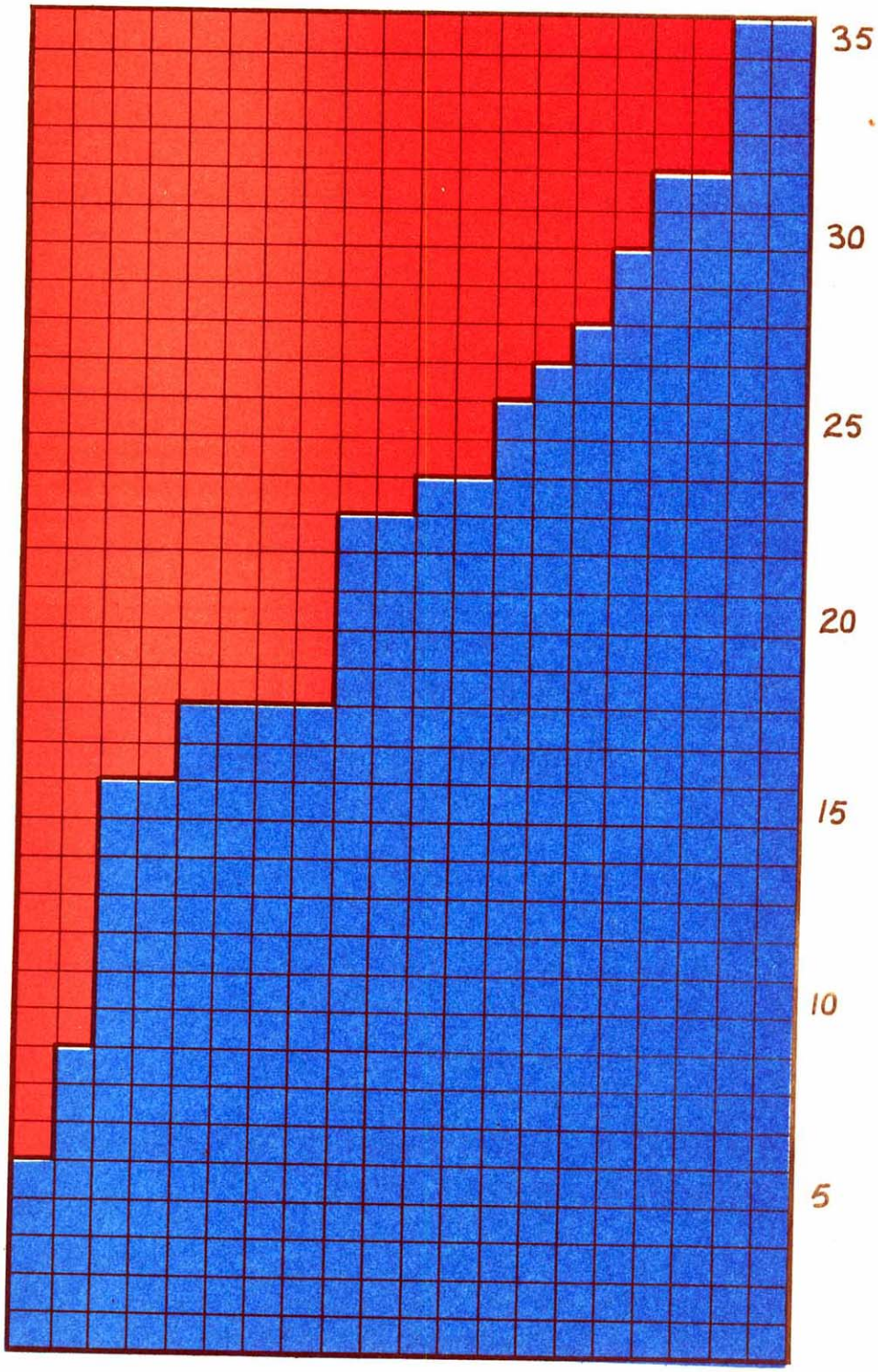
the constant daily supply is 35 newspapers.

Complete:

BALANCE SHEET for 20 day experimental period			
DAILY SUPPLY	TOTAL GAIN	TOTAL LOSS	TOTAL PROFIT
35			

With such a supply, Shunda could satisfy her customers every day, but is it her most profitable choice ?

Don't you think there are too many red squares in this record ?


35
30
25
20
15
10
5

Suppose Shunda would decide on a constant daily supply of 20 newspapers.

Page 21 shows the record (profit-o-meter) for the 20 day experimental period

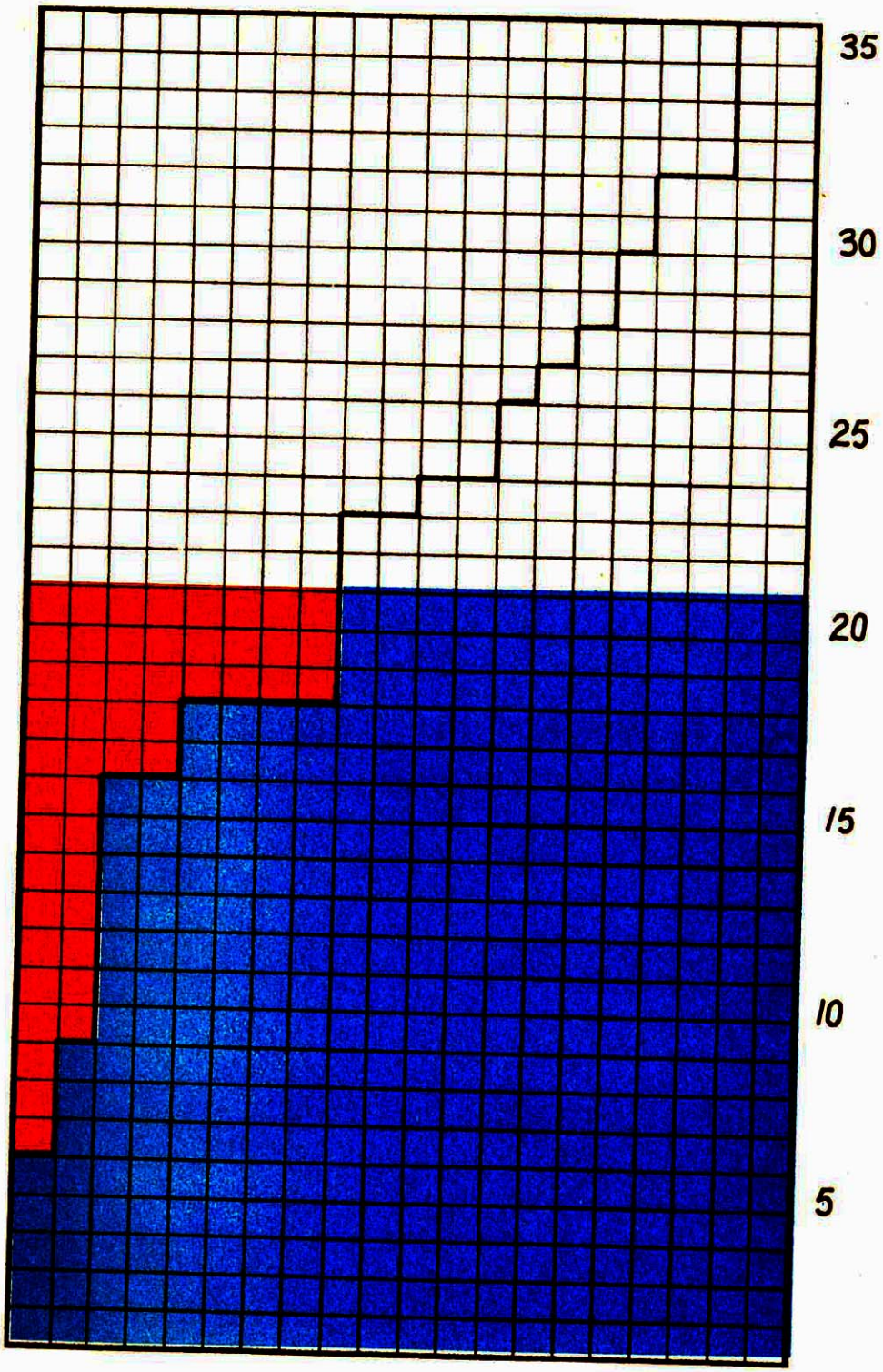
IF

the constant daily supply is 20 newspapers.

Complete:

BALANCE SHEET for 20 day experimental period			
DAILY SUPPLY	TOTAL GAIN	TOTAL LOSS	TOTAL PROFIT
20			

Shunda found that 20 was a better choice than 35 for the constant daily supply. But is it the best possible choice ?


35
30
25
20
15
10
5

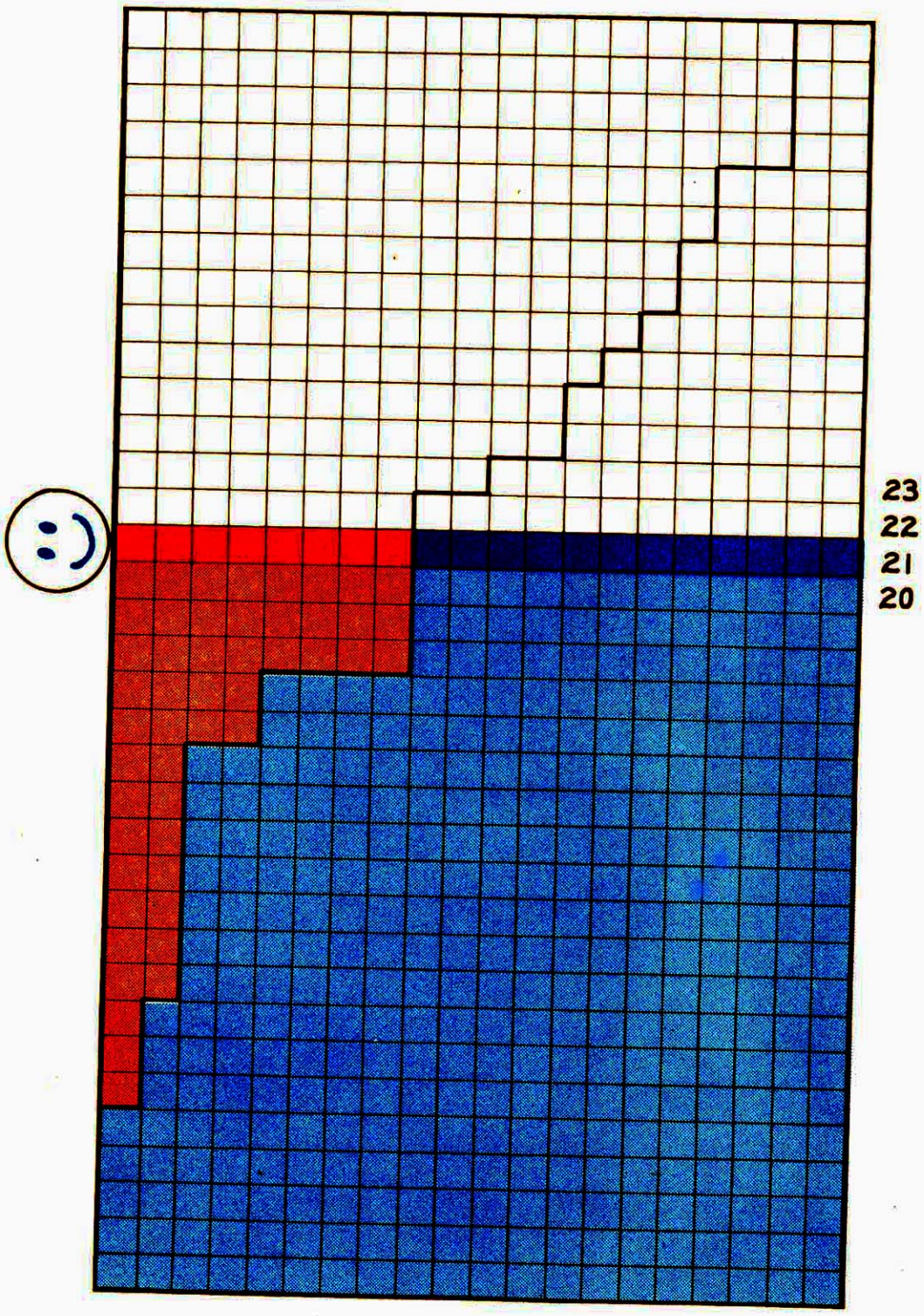
Shunda asks herself, "Would a constant daily supply of 21 newspapers be a better choice than 20?"

Using her profit-o-meter, Shunda finds that a constant supply of 21 would increase her profit by

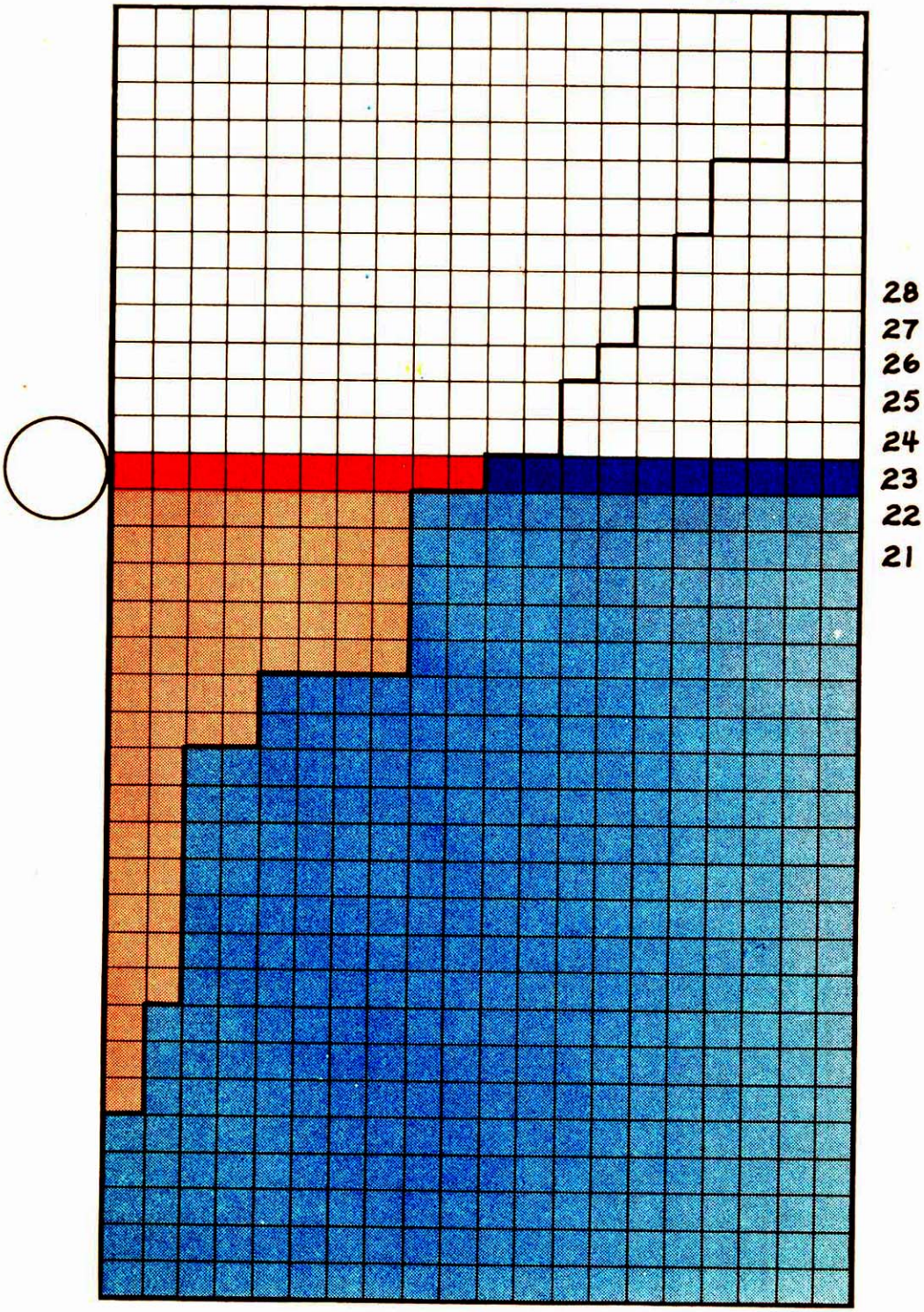
$ .80

Looking at the picture on page 23, Shunda notices immediately that changing the constant daily supply from 21 to 22 newspapers would again increase her profit by

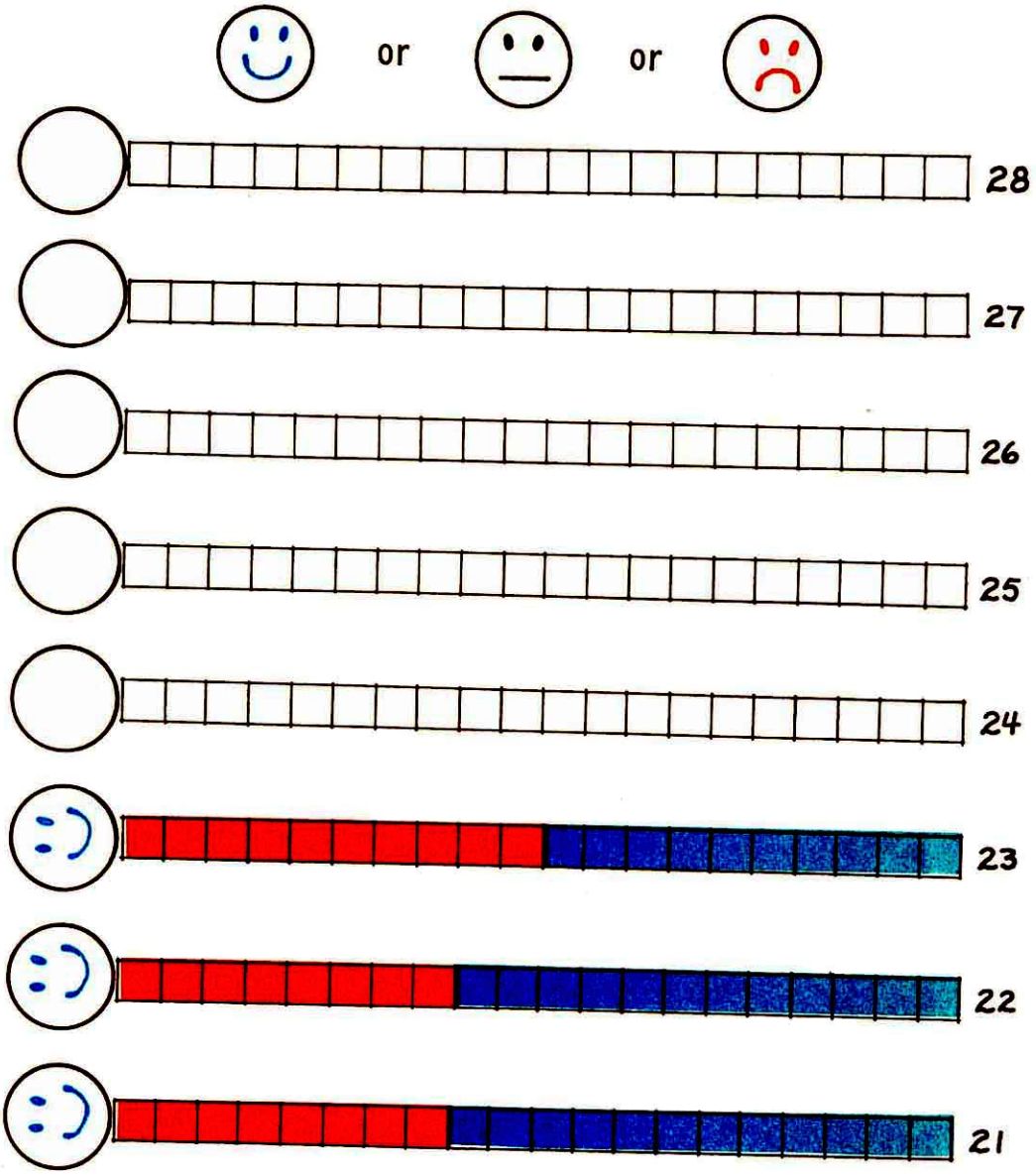
$ .80


23
22
21
20

Complete :  or  or 



Color the strips and complete the faces :

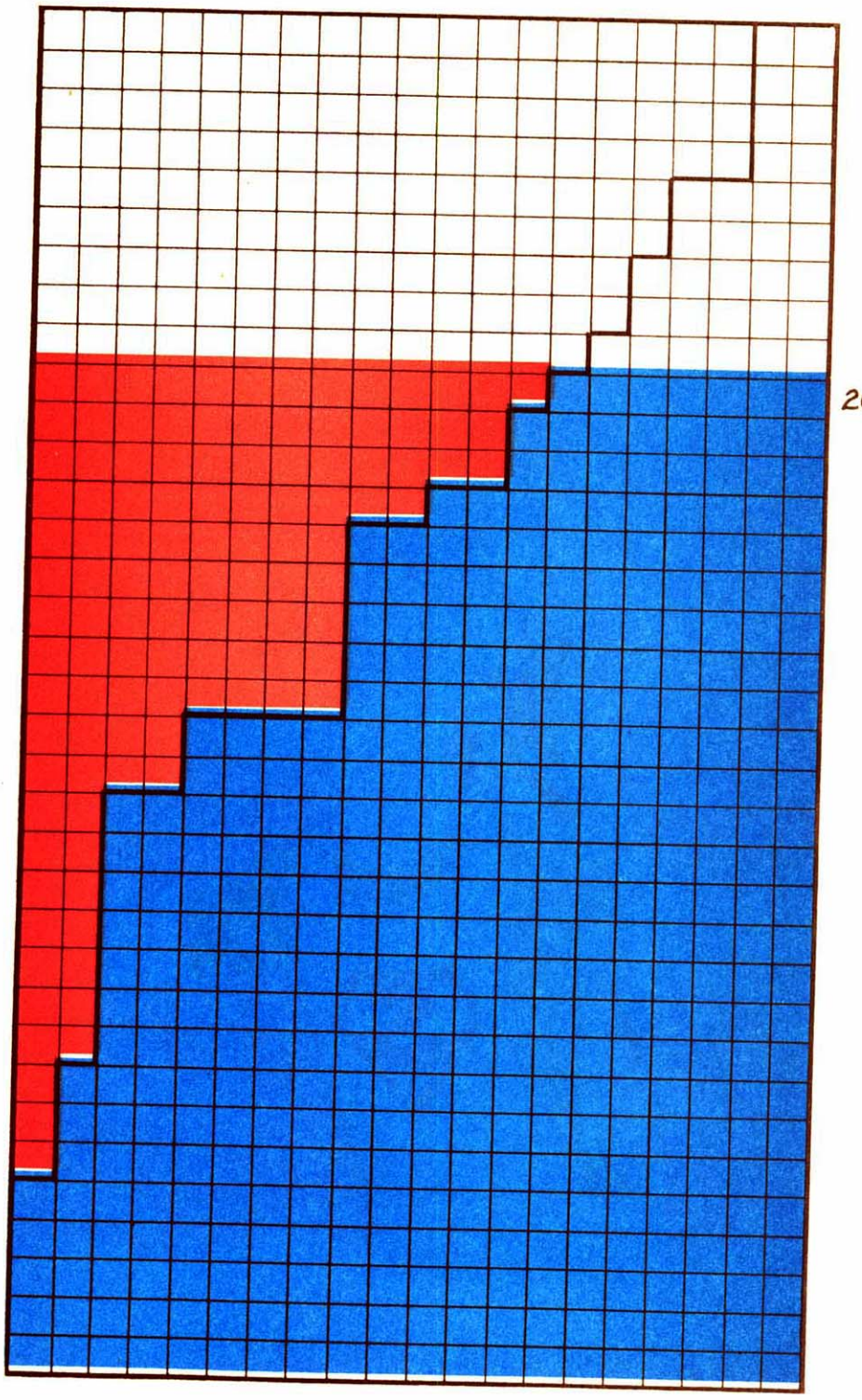


SHUNDA'S CONCLUSION

During the 20 day experimental period, the largest profit would have been obtained with a daily supply of 26 newspapers.

Complete:

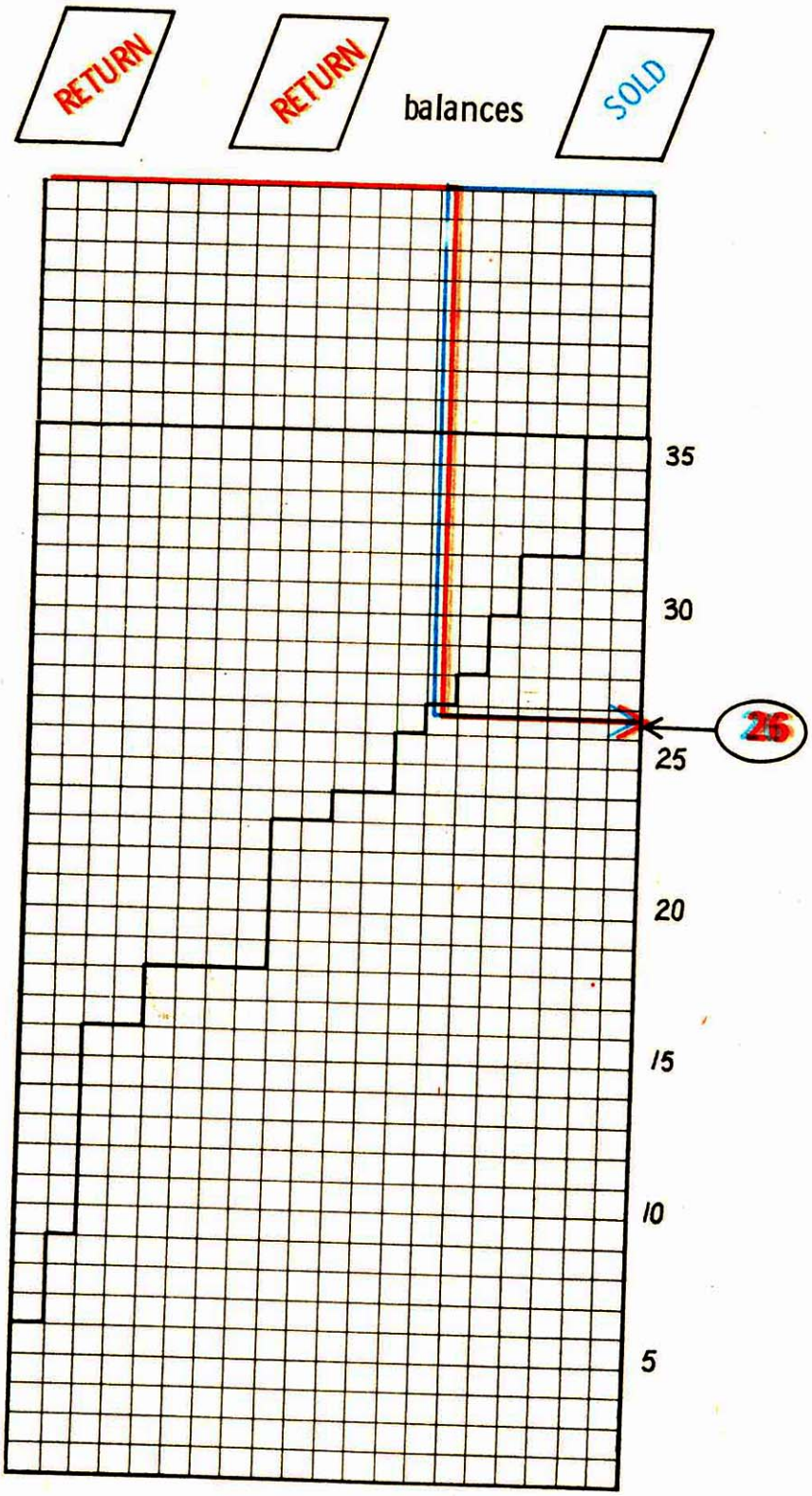
BALANCE SHEET for 20 day experimental period			
SUPPLY	TOTAL GAIN	TOTAL LOSS	PROFIT
26			



26

Shunda is very clever. She found that the best choice of a constant daily supply can be determined without much calculation.

Do you understand Shunda's idea?


RETURN
RETURN
balances
SOLD
35
30
26
25
20
15
10
5

CONCLUSION

Since 26 would have been the best constant supply for the 20 day experimental period, Shunda decided to adopt it.

Of course, she is not absolutely sure this will remain the most profitable choice. But for now, what choice could be better ?

Shunda cannot forecast future demand; for example, she has no power to prevent people from staying home because of bad weather. In her business, Shunda cannot avoid taking a risk. What she did was to make the best choice based on the evidence she had.

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MATH STORY-WORKBOOKS

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Ages 8-11

ROLLERSKATING 37
TO PICTURE
A SHORT STORY ABOUT 2 FRIENDS
A SHORT STORY ABOUT 3 FRIENDS
THE ISLAND OF TAM - TAM
THE TALKATIVE NUMBERS

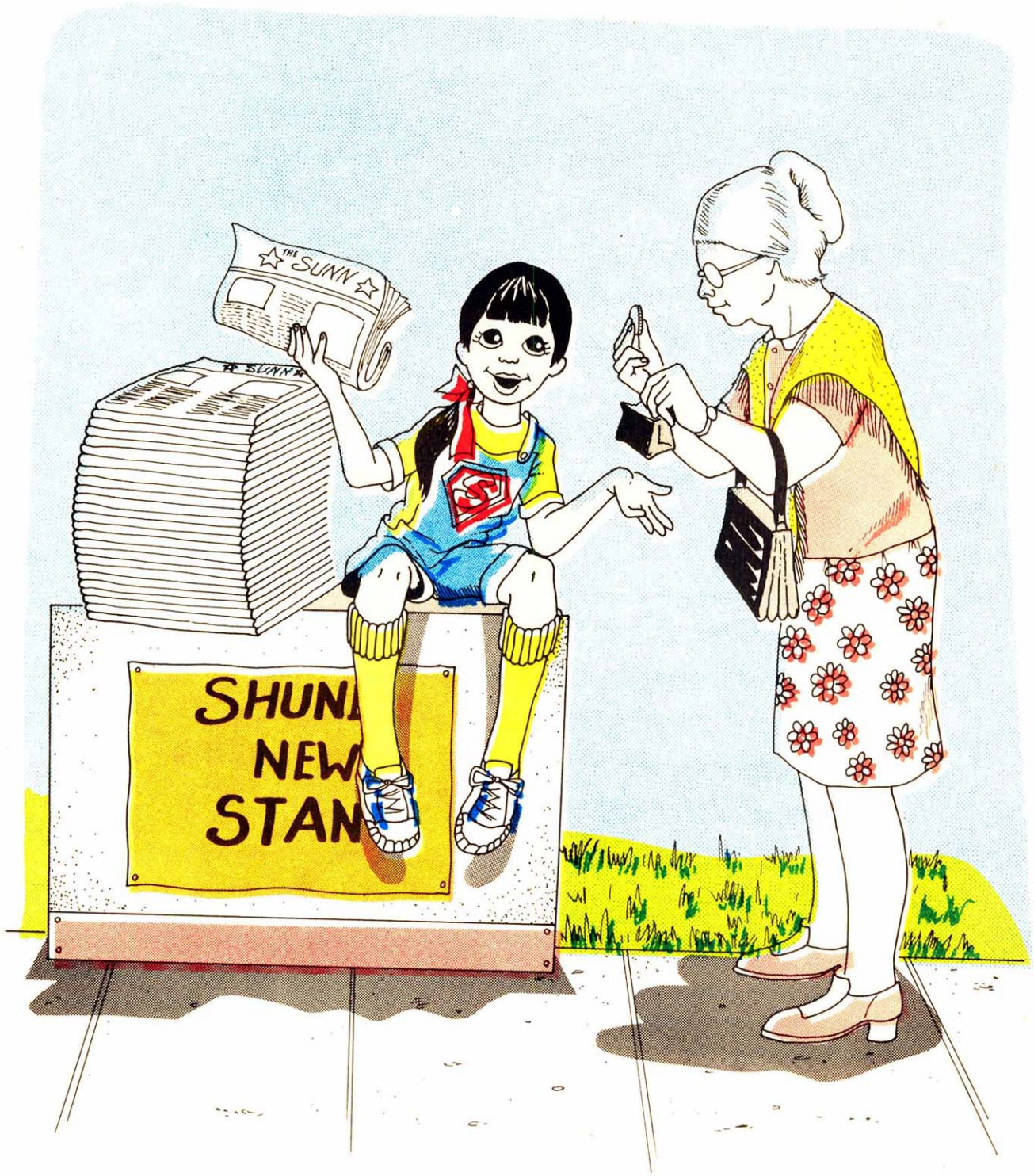
Ages 9 - 14

SUMMER CAMP
HALLOWEEN PUZZLES
1,000's DREAM
A STRANGE COUNTRY
NOT TOO CLOSE
WHO ARE WE?
CLINTON STREET
A BOOK ABOUT ME
SEVEN SECRET NUMBERS
SHUNDA'S NEWSSTAND

A series of story-workbooks providing fanciful excursions in the colorful world of mathematics for all young people, their teachers and their parents, actively involving them in the acquisition of new mathematical insights.

A very common problem for a merchant is to determine the optimal quantity of items to buy in order to have the most profit. Nobody can be sure to make the best prediction; there is always a risk. All one can do is decide what is the most reasonable prediction. That is what Shunda, a newspaper seller, does when faced with the problem of supplying her newsstand with papers. With the help of many stimulating pictures, Shunda and the reader are gently lead through a solution of this common applied mathematics problem.

This story was directly inspired by lessons of Frederique Papy (see "Nebuchadnezzar, seller of newspapers: an introduction to some applied mathematics", The Arithmetic Teacher, Vol. 21 (1974) pp. 278-285) and indirectly by the first chapter of the book by Kaufman and Faure, Introduction to Operational Research, Paris: Dunod, 1965.


THE SUNN
SUNN
SHUN
NEW
STAN