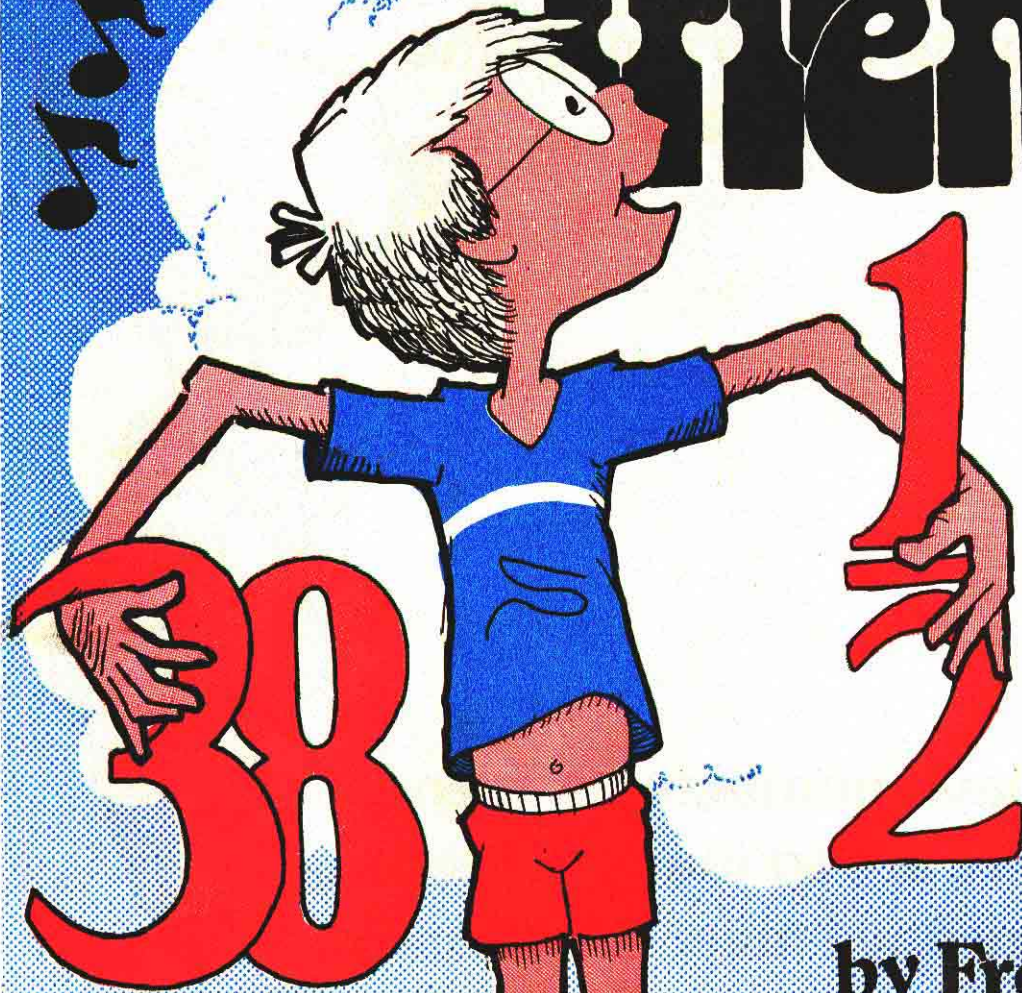# Singing friends

38 1/2

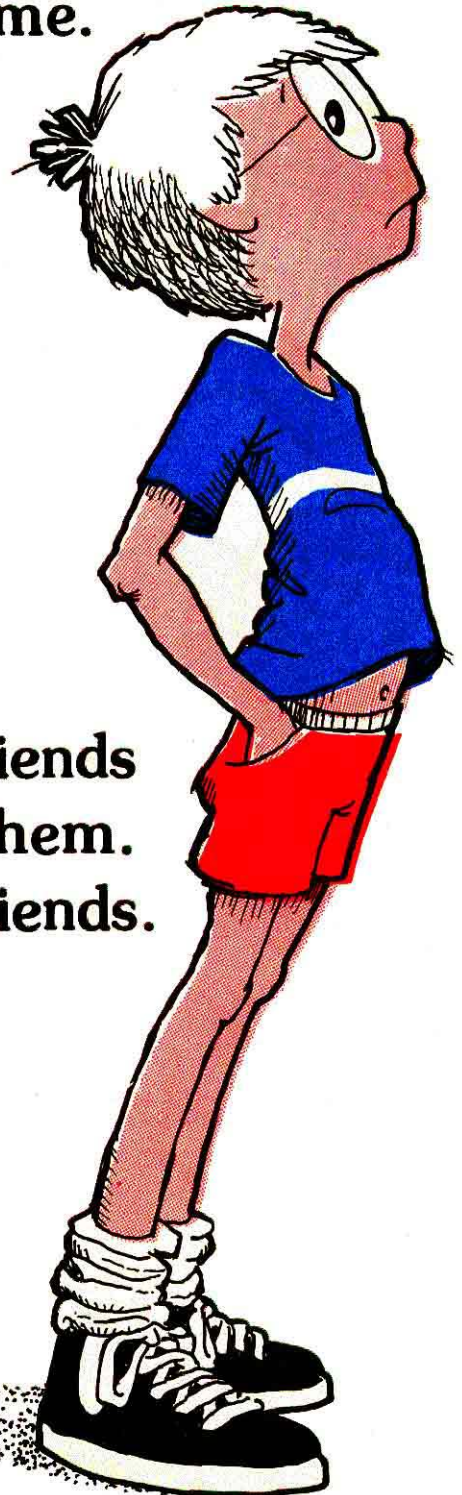## by Frédérique

Pictures/Design
Steven Sims
Elliot Green

1/16

Whenever I am very sad, I play with numbers. All of the numbers are my friends. They are always joyful; they invent lots of games to amuse me. I soon forget my sadness.

It's fun to have numbers as friends because there are so many of them. Almost every day I meet new friends.

Some are very little.

1 3 5 7 10 14
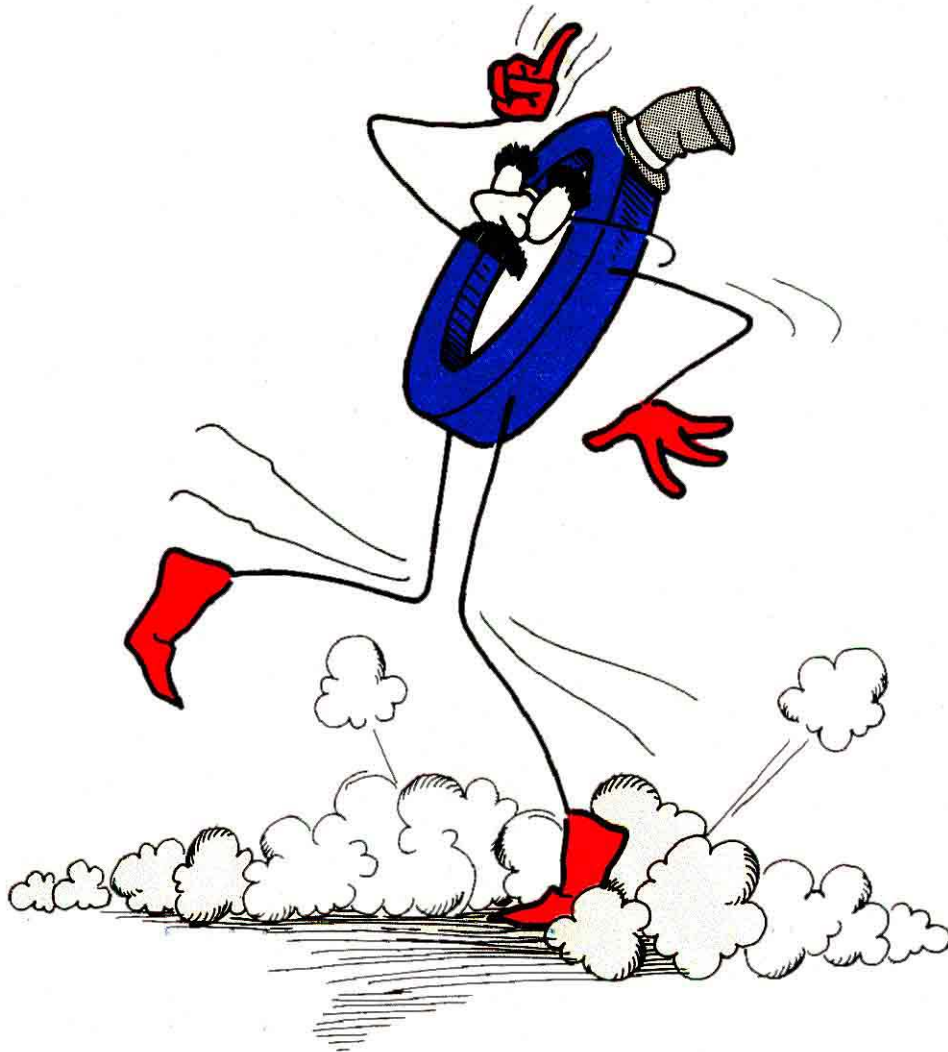
Others are very large.
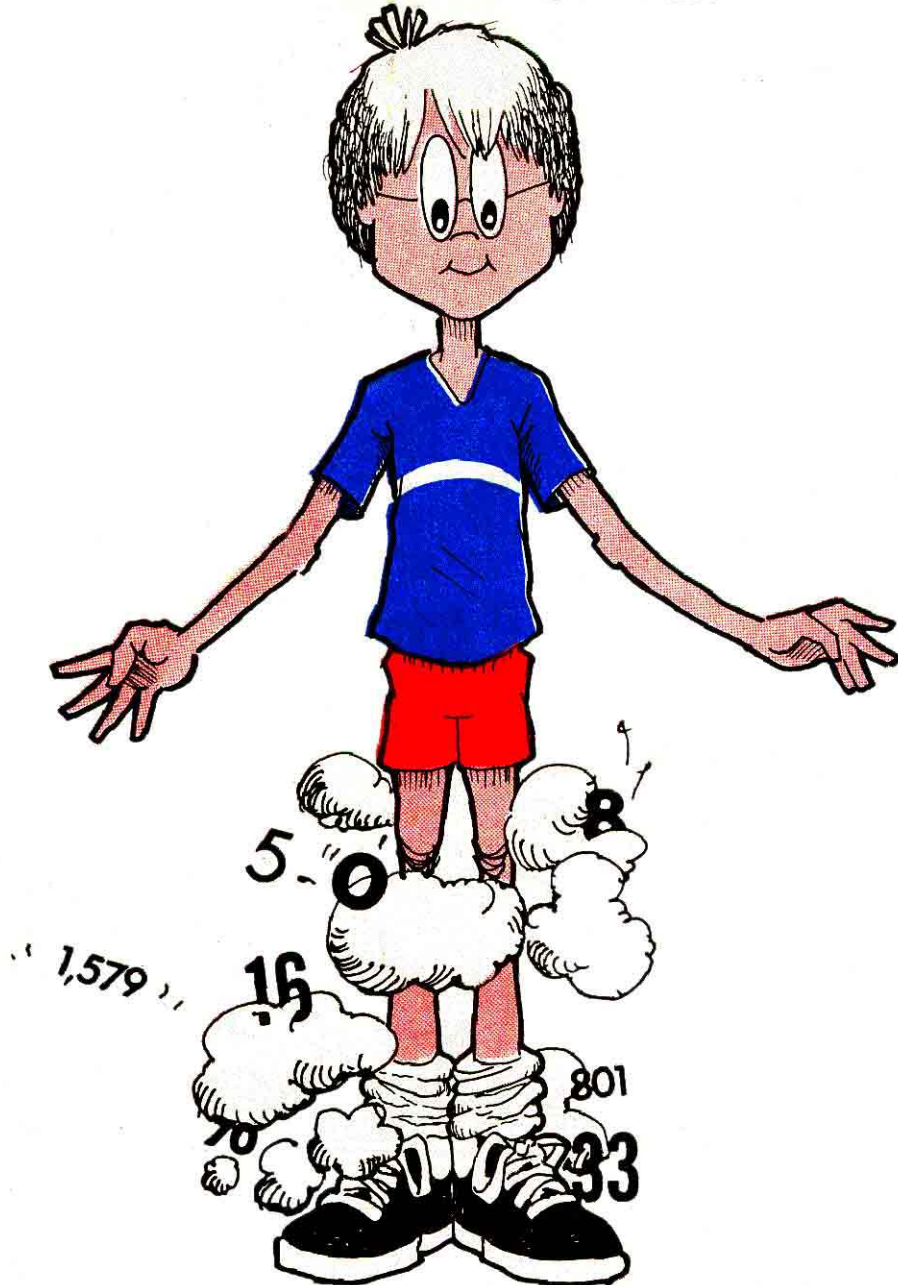
1,000

17,000

65,375

I like them all.

The funniest number is 0.

Perhaps you believe that 0 is nothing, but I don't think that is true. 0 is one of my best friends and the most interesting number I know.

One Sunday afternoon I played with some of my friends. We ran, danced, and jumped for many hours. We had lots of fun.

Perhaps you do not recognize all of my friends. Be a little patient. I will introduce them to you.

At the end of the afternoon, I was tired and thought, "I like my friends very much, but they are too noisy!"
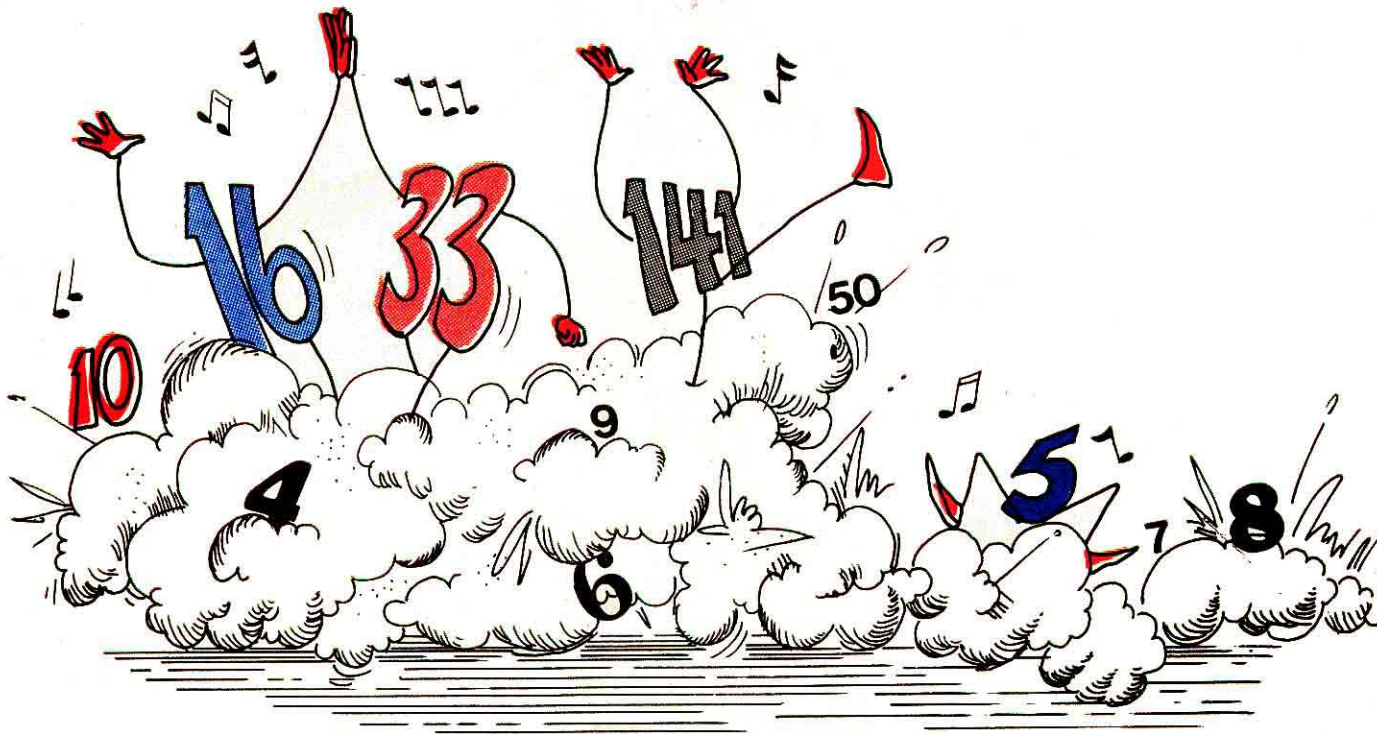
"They run and jump everywhere in the house; they sing and shout without stopping."
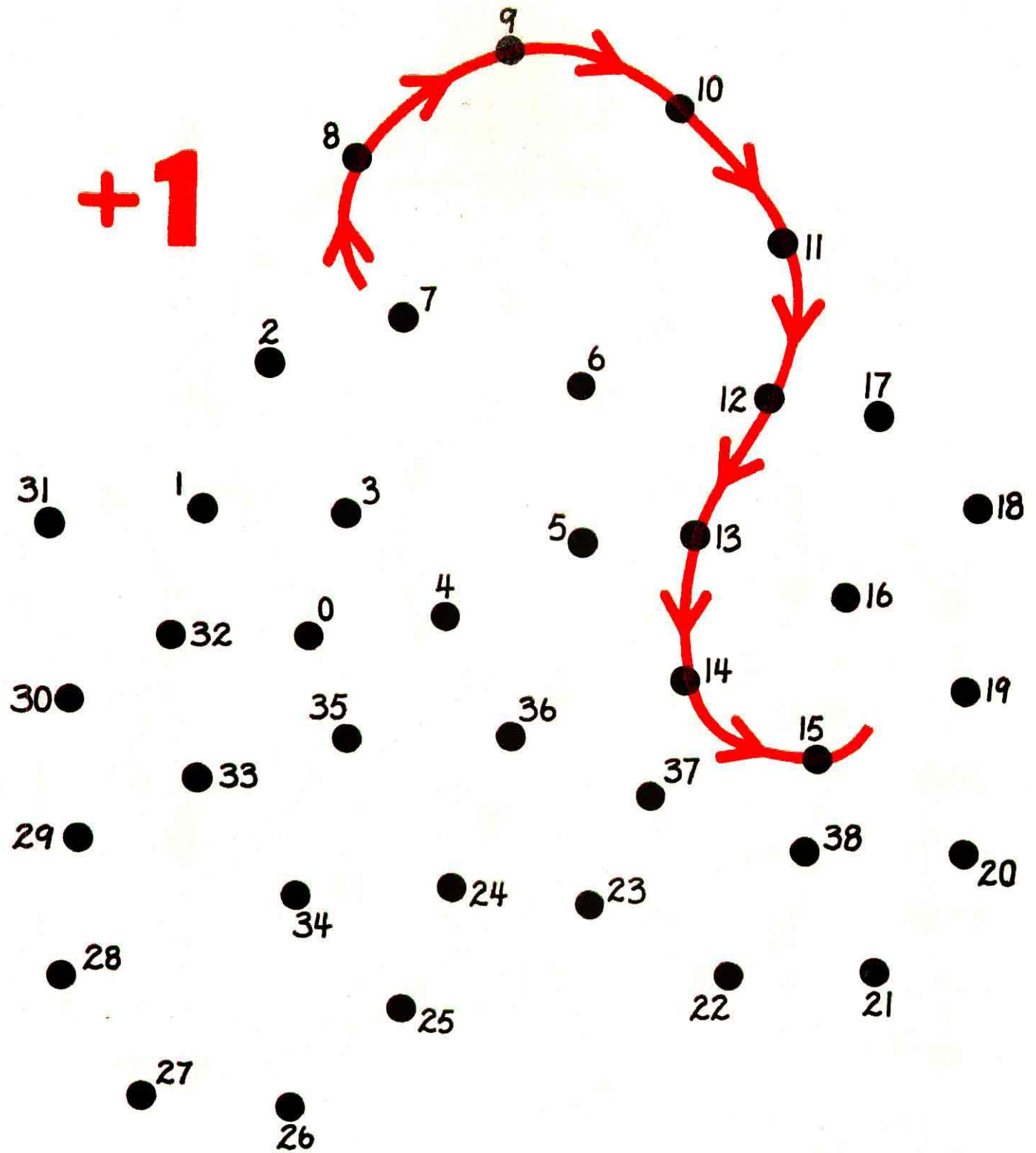
"Next Sunday I will suggest a new game."

NEXT SUNDAY . . .

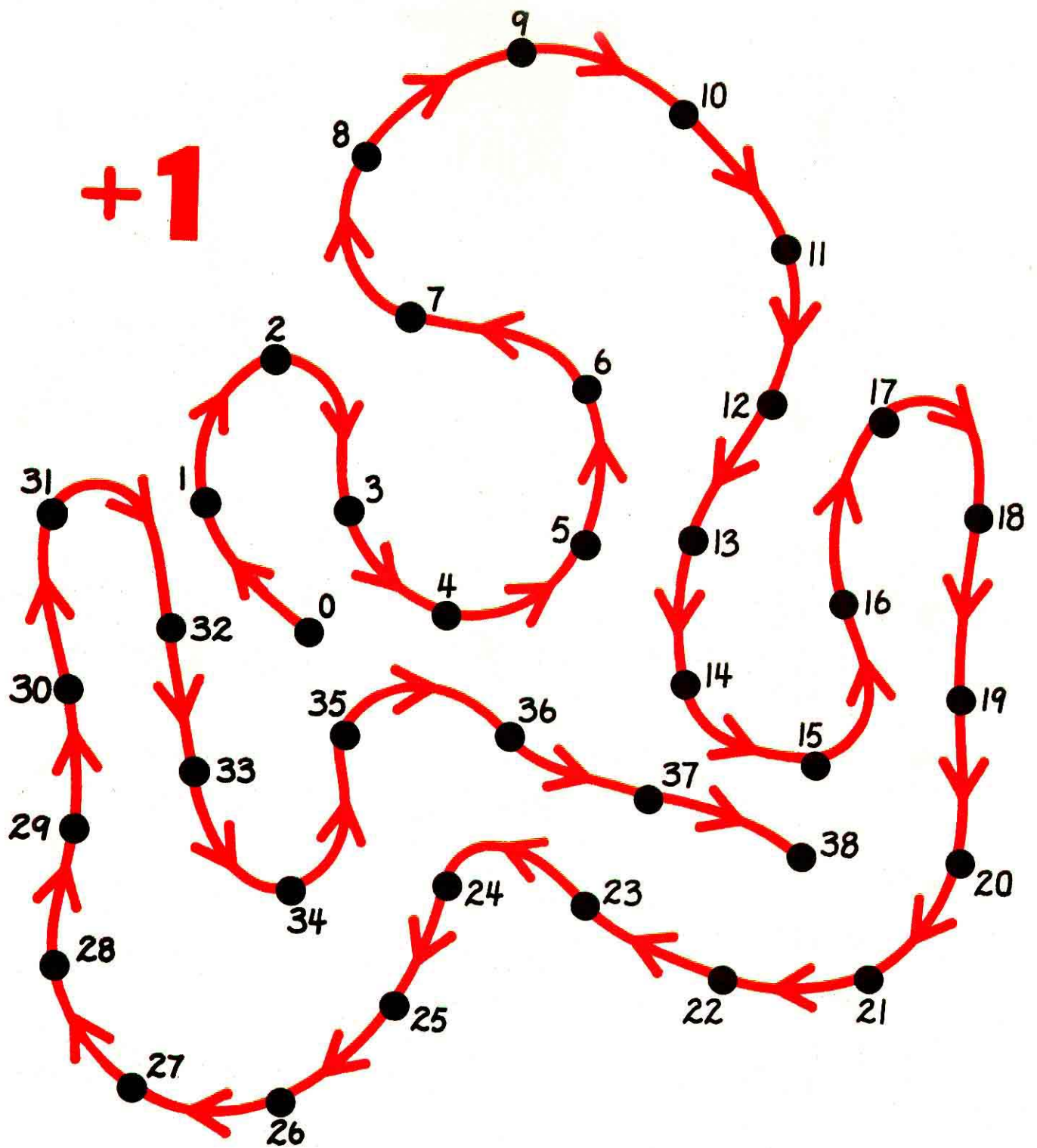Here are my friends . . . not exactly the same numbers as last week.

I said, "Today we will play a game that you will like, the +1 snake dance."

"Go on by yourself," I ordered them.

+1

CAN YOU FINISH THE PIC-
TURE FOR MY FRIENDS?

9

+1

9
10
8
11
7
2
6
12
1
3
17
31
32
5
18
0
4
13
16
30
14
35
36
19
33
37
15
29
38
34
20
28
24
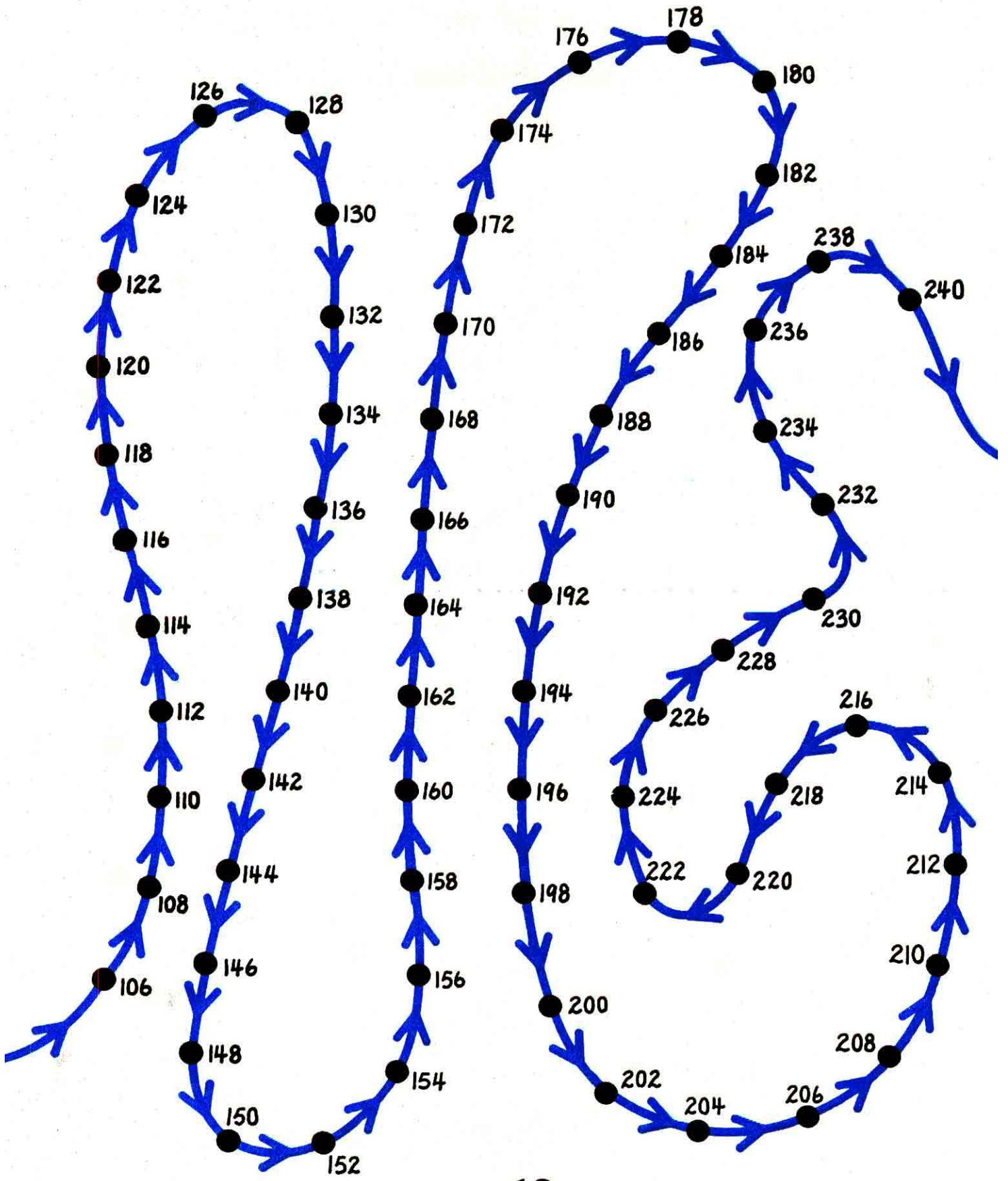23
27
25
21
22
26

10

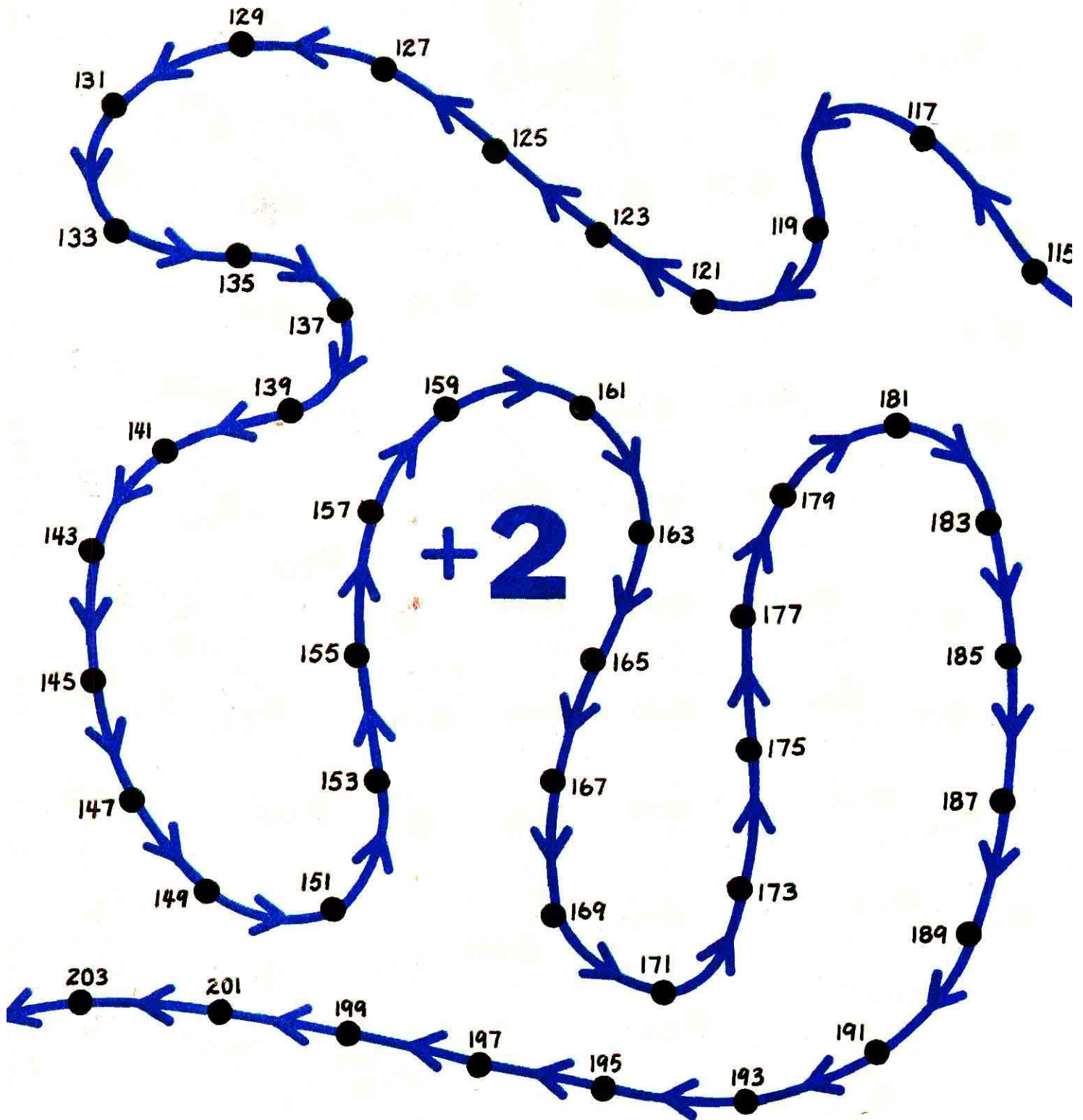My friends are clever. They understood the game very quickly.

Soon the + 1 snake was organized, and the numbers enjoyed the dance very much.

But 38 was a little unhappy. "Please, next time invite some more friends. I feel uneasy. I am not like the others in this game."

0 replied, "Me too, but I like my part in this game. I have a very important role. I start the dance."

The following Sunday was my birthday. My parents gave me a BIG party. As a birthday present, my friends invented a new dance they call the **+2 snake dance.**

+2

72 70 74 68 76 34 36 32 78 38 66 90 92 10 30 64 88 80 8 12 94 0 6 28 62 86 82 40 14 26 60 96 42 24 98 16 58 100 44 18 22 56 102 46 20 104 48 54 50 52

12

13

Here are some of my friends in
their part of the + 2 snake dance.

129
127
131
125
123
117
133
119
135
121
115
137
139
159 161
141
157
+2
163
143
165
145
155
153 167
147
151 175
149 169
177
179 181
183
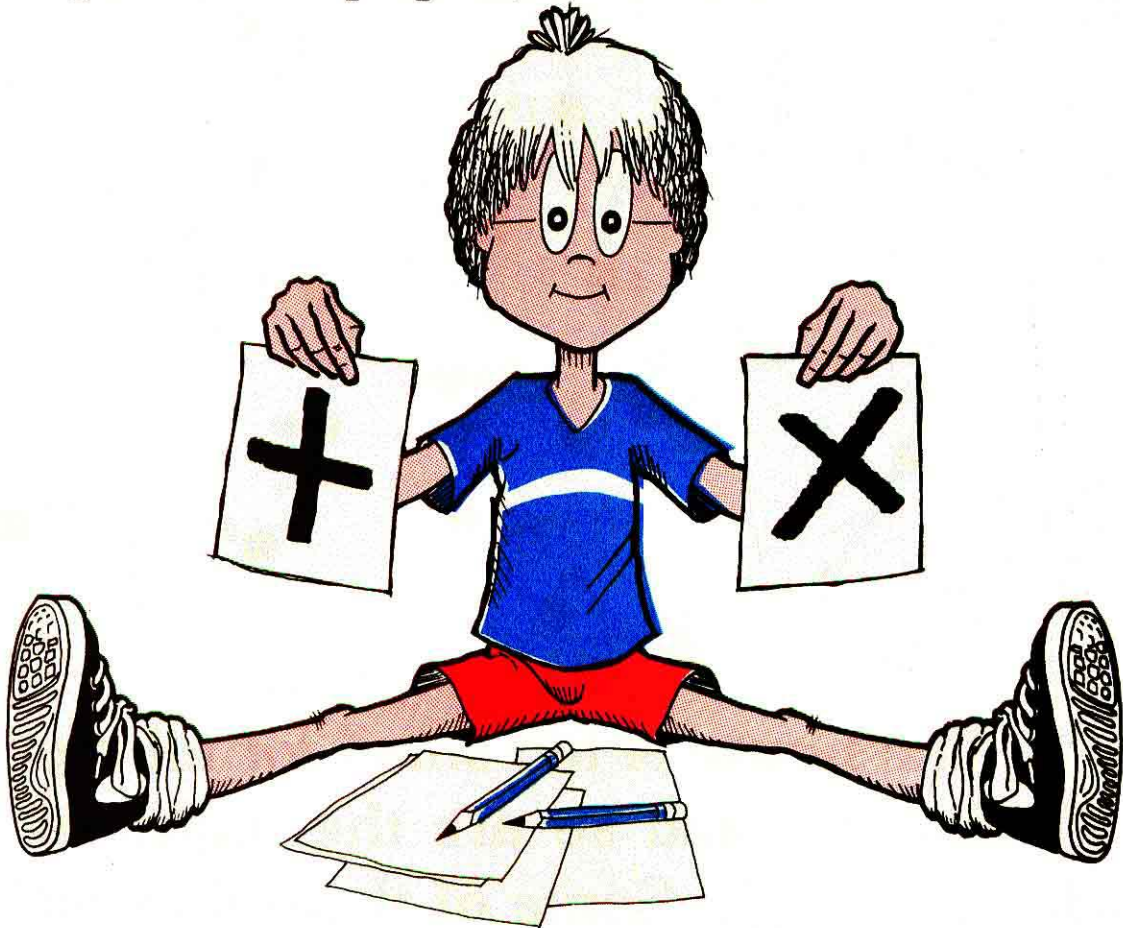185
187
173
189
171
191
203 201 199
197
195
193

14
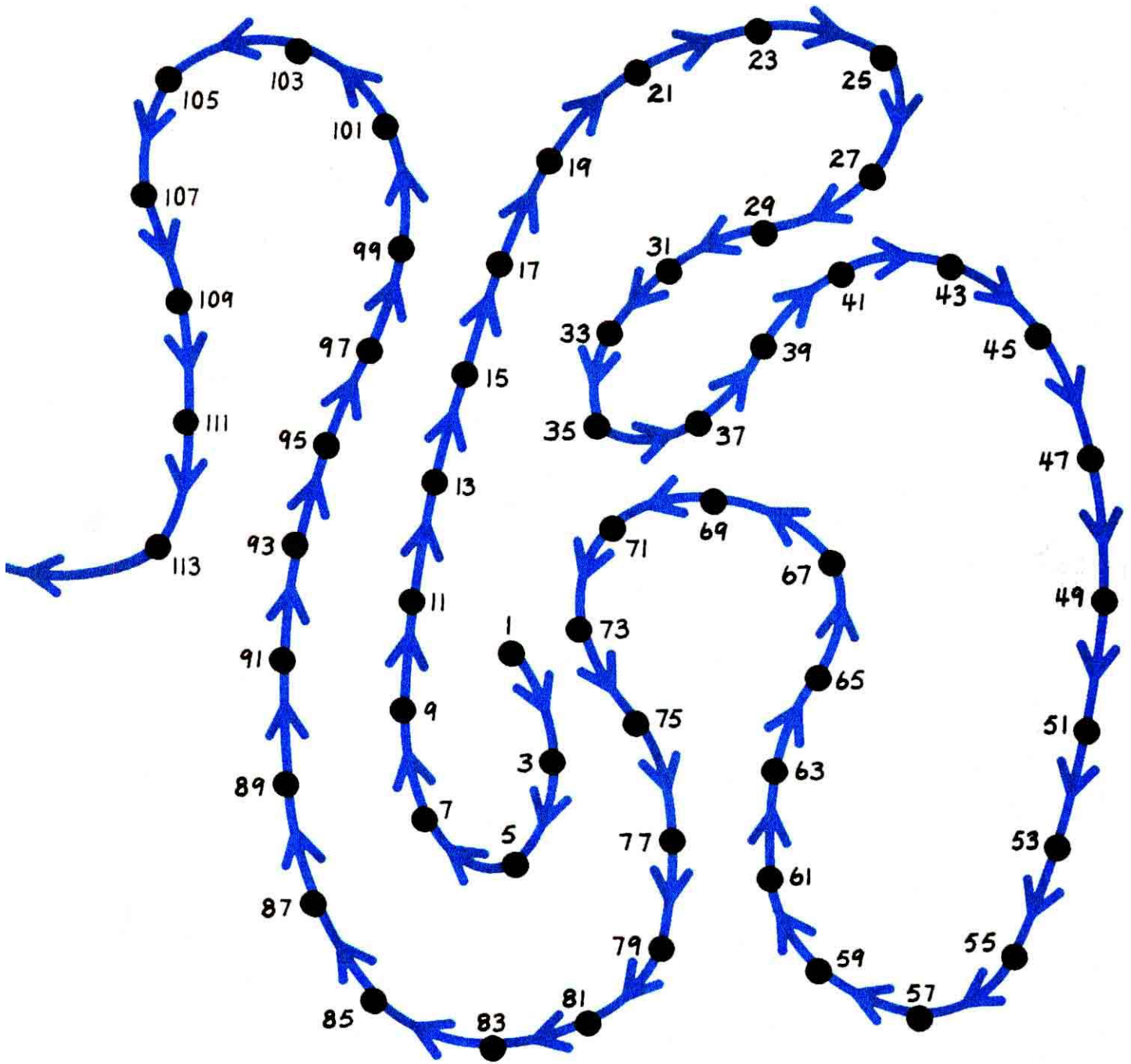
The house is too small for all my friends, and so are the pages of this book. Some of them danced in the yard. You don't see them here, but you can imagine them.

15

The next day I was very tired. I had to take it easy, so I played with only three of my friends.

3   5   2

They were very quiet. On two pieces of paper, I drew . . .

. . . and put them between my friends.

$3 + 5 \times 2$

They looked back and forth at each other. They seemed to be very uncomfortable.

"But now we name a new number," they said.

"We name the number 16," said 3.

"Wrong! We name the number 13," replied 2.

5 was silent and thoughtful.

But 3 and 2 became very angry and they continued to argue.

Then 5 said, "I think you could both be right. It depends how you look at us. If someone looks at us this way,

$$3 + 5 \times 2$$

then that person thinks we name the number 16."

"But if someone looks at us this way,

$$3 + 5 \times 2$$

then that person believes we name the number 13."

I smiled and drew two parentheses. I put them like this:

$$(3 + 5) \times 2$$

"Now we name the number 16," agreed 3 and 2.

I moved the parentheses:

$$3 + (5 \times 2)$$

"And now, we name the number 13," they said.

It was so quiet in my little room. We were all thinking. "It really is a strange game," concluded 3 and 2.

"What happens if we switch +
and × ?" asked 5.

$$3 \times 5 + 2$$

"We would name the number 17,"
shouted 3.

"Wrong! We would name the
number 21," argued 2.

Again they began to fight. "Be a little patient," said 5. "We can use the parentheses in order to make it clear which number we name."

$$(3 \times 5) + 2$$

"Now we name the number 17," agreed 3 and 2.

5 put the parentheses in another way.

$$3 \times (5 + 2)$$

"And now, we name the number 21."

"I understand," concluded 2. "Without using the parentheses, it is difficult to decide which number we name."

Yesterday at school I met my friend 1/2, who had been sick and could not come to my big birthday party.

I told my friend the story of my birthday present, the +2 snake dance. Little 1/2 commented sadly, "I am not like your other friends, the whole numbers, that you invited to the party. It is not possible for me to join with them in this new dance."

"True," I said. "But I can invent a new game for you."

That afternoon I invited my friends 0, 1/2, 1, 2, 4, 8, and 16 to come home with me. "I want to teach you a new dance," I told them.
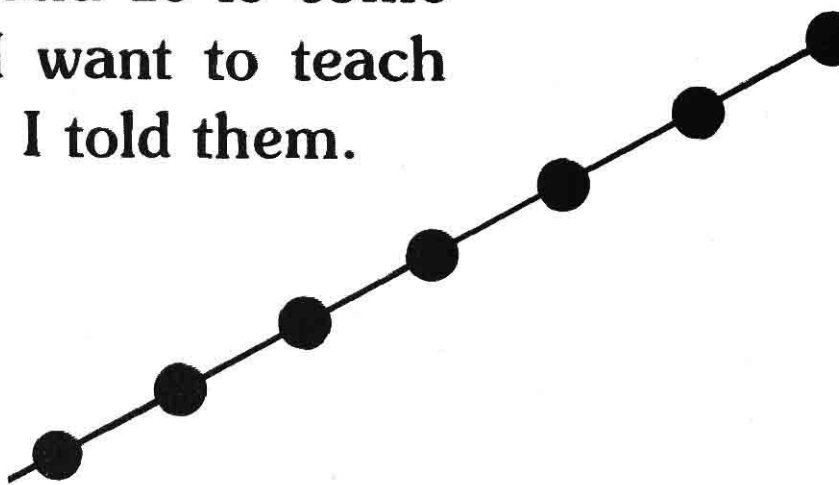
I drew a line segment on the floor and very carefully marked evenly spaced dots.
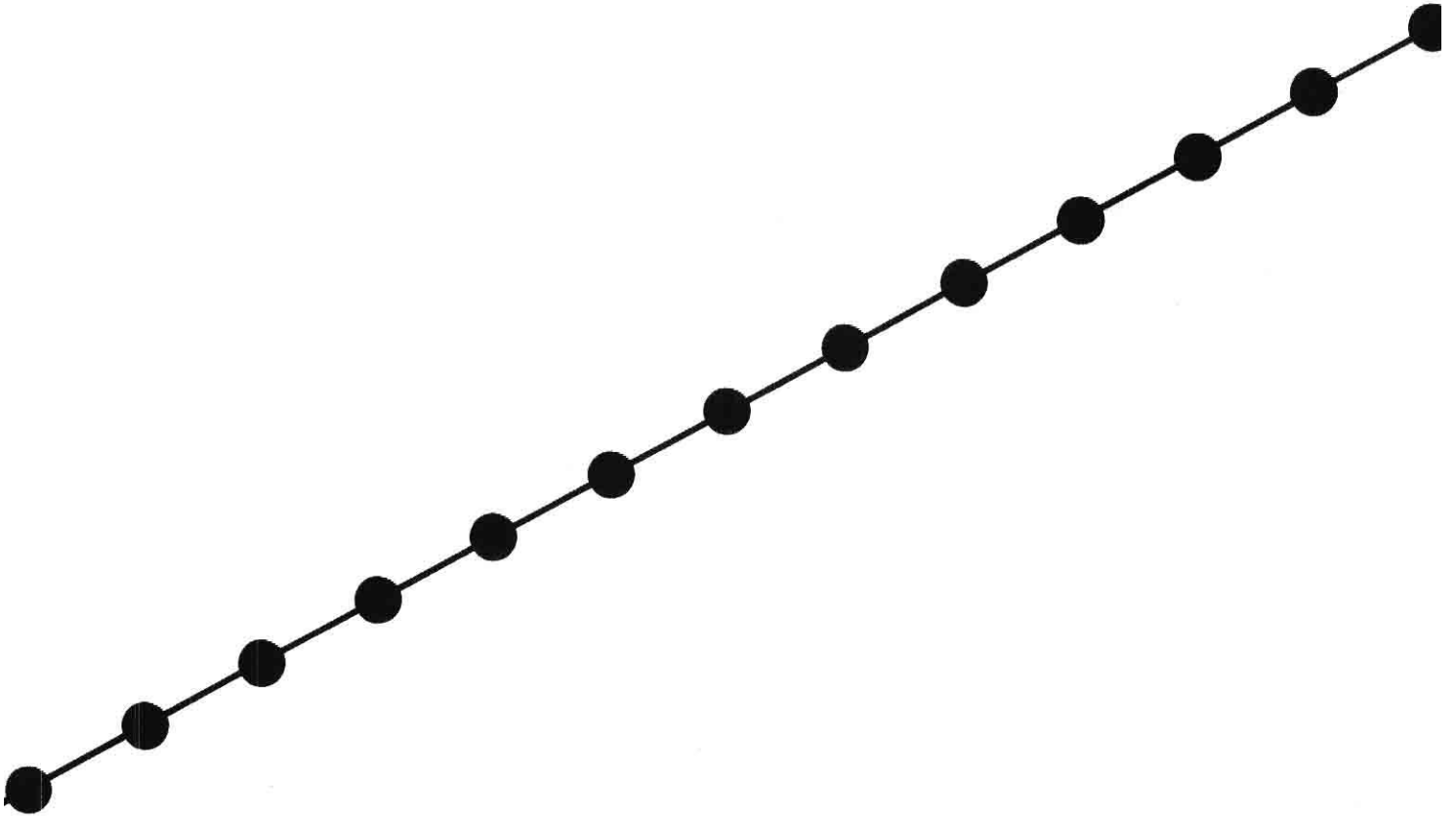
"Why do you draw a ruler like in school?" asked 1/2. "It's not very much fun."

But before I had time to speak, the other numbers ran and chose their places.

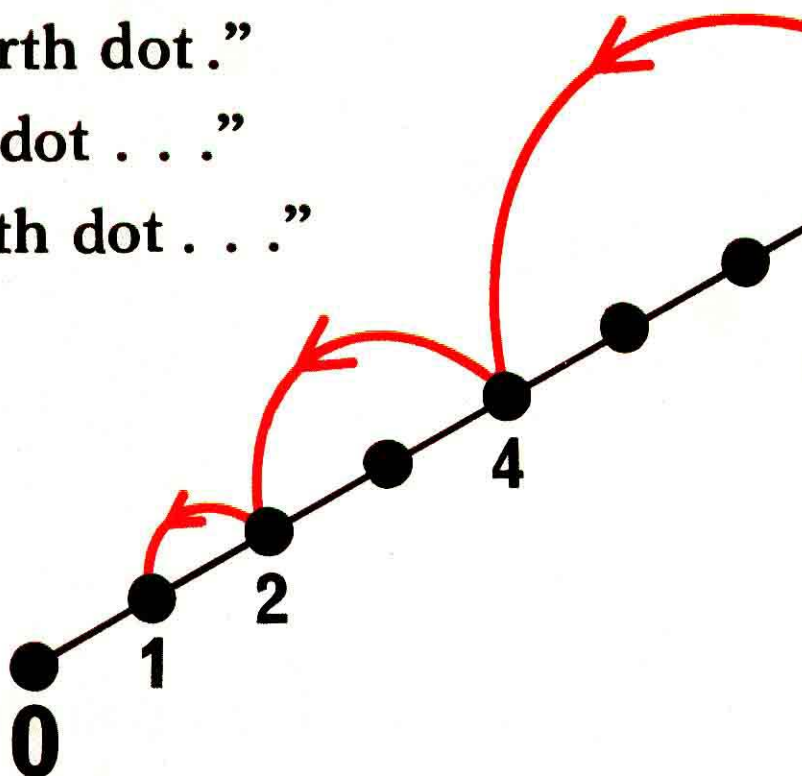"I am the leader," announced 0, "so I stand at the beginning."
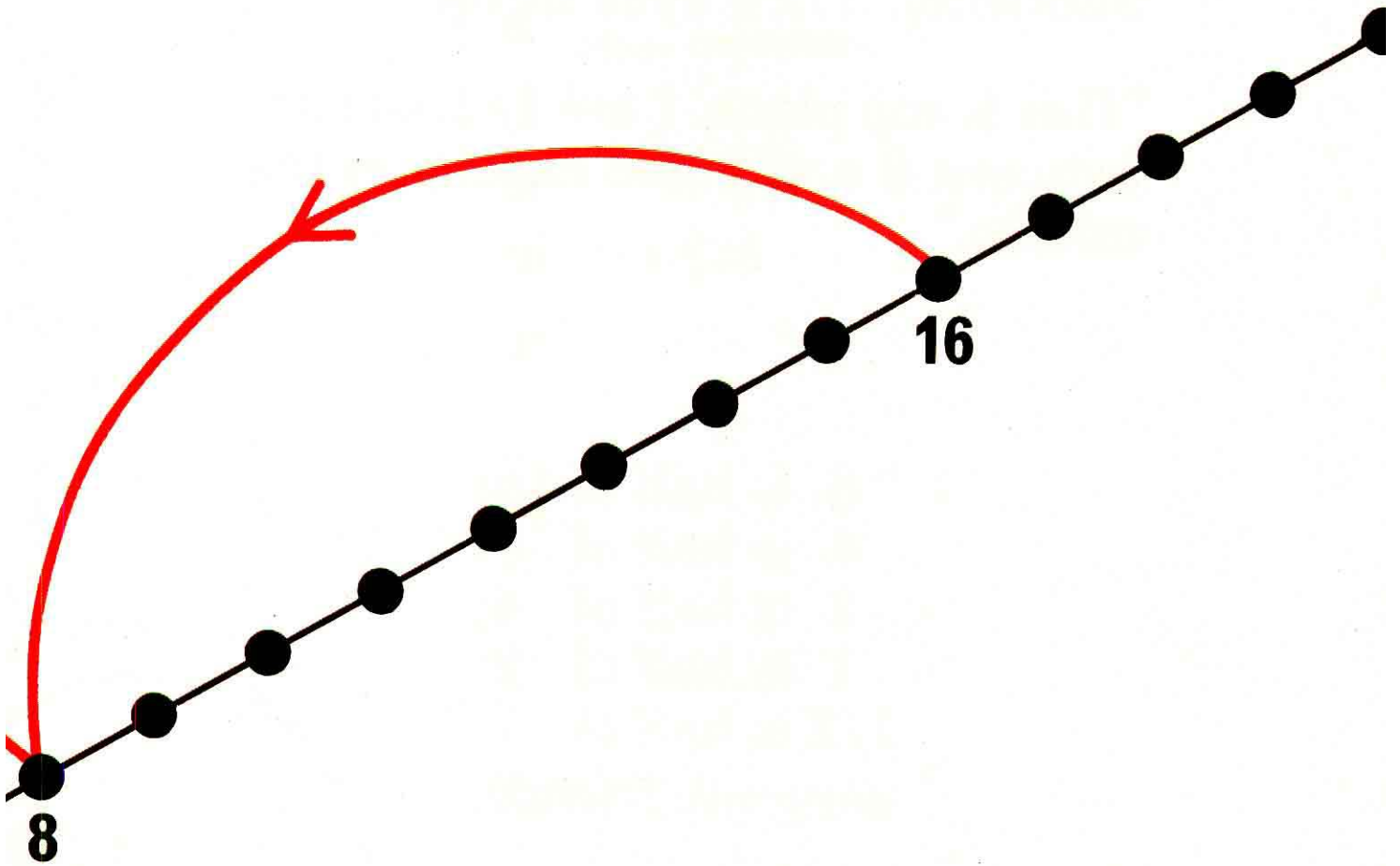
"I am the number 1, so I am at the first dot next to 0."

"And me, I'm at the second dot," said 2.

"Me, the fourth dot."

"The eighth dot . . ."

"The sixteenth dot . . ."
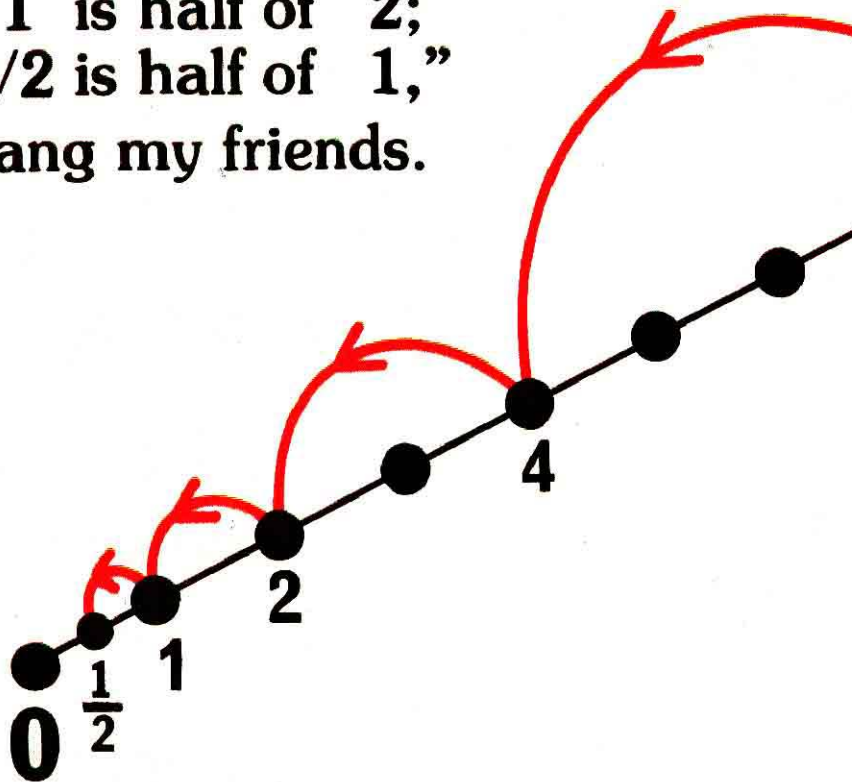
They all shouted together.

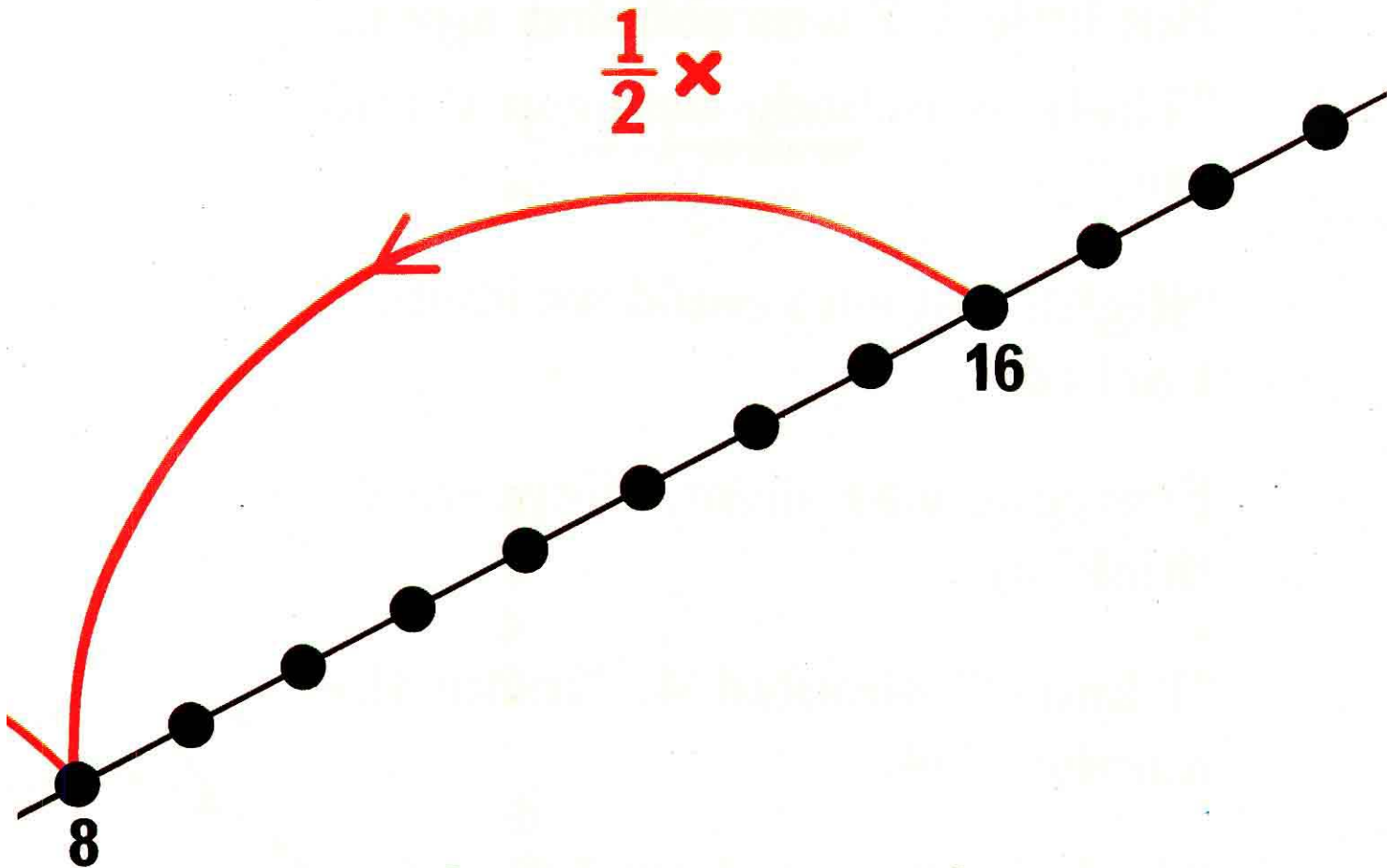My little friend 1/2 began to cry. "I feel so lonely. You always forget me."

"Instead of crying, try to find your place," I suggested.

Suddenly, 1/2's eyes lit up.

"This is my place. I am 1/2, so I am between 0 and 1 and exactly in the middle."

" 8 is half of 16;
　4 is half of 　8;
　2 is half of 　4;
　1 is half of 　2;
1/2 is half of 　1,"
sang my friends.

0　$\frac{1}{2}$　1　2　4

$$\frac{1}{2} \times$$

0 proudly observed:

" 8 is halfway between 0 and 16;
  4 is halfway between 0 and   8;
  2 is halfway between 0 and   4;
  1 is halfway between 0 and   2;
1/2 is halfway between 0 and   1.

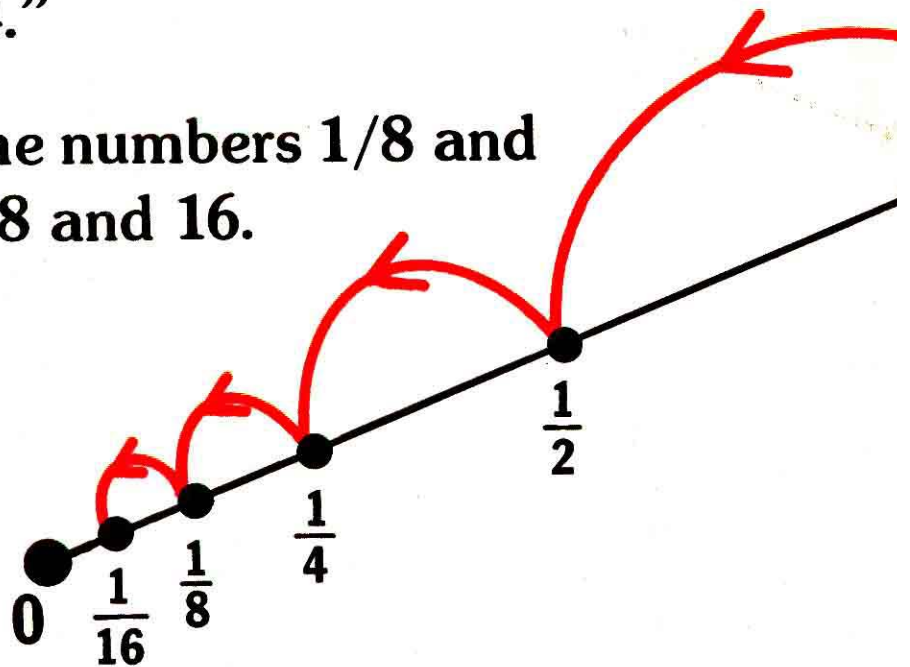I am very important!"

But little 1/2 was sobbing again. "There is nobody between 0 and me."

"Right! But who could we invite?" I asked.

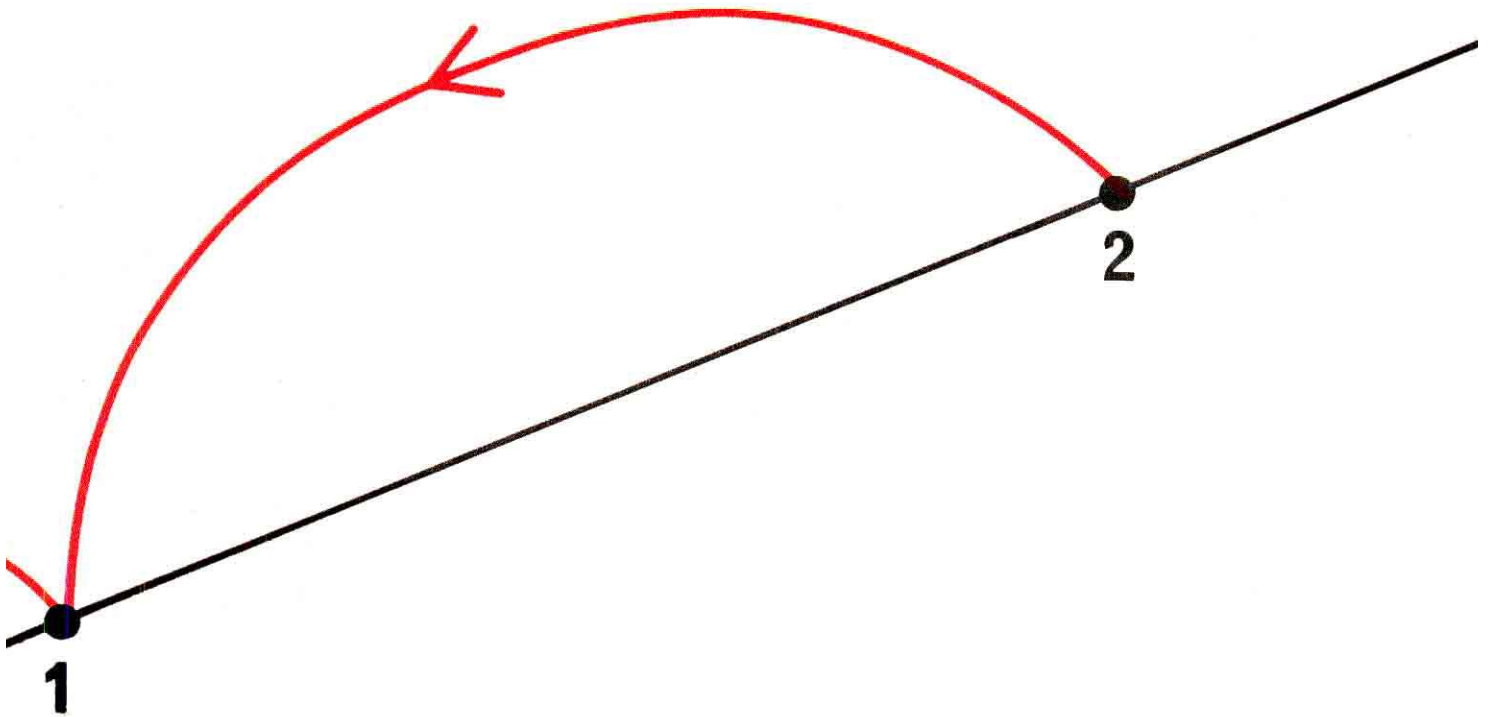Everyone was silent. We were all thinking.

"I know!" shouted 4. "Invite the number 1/4."

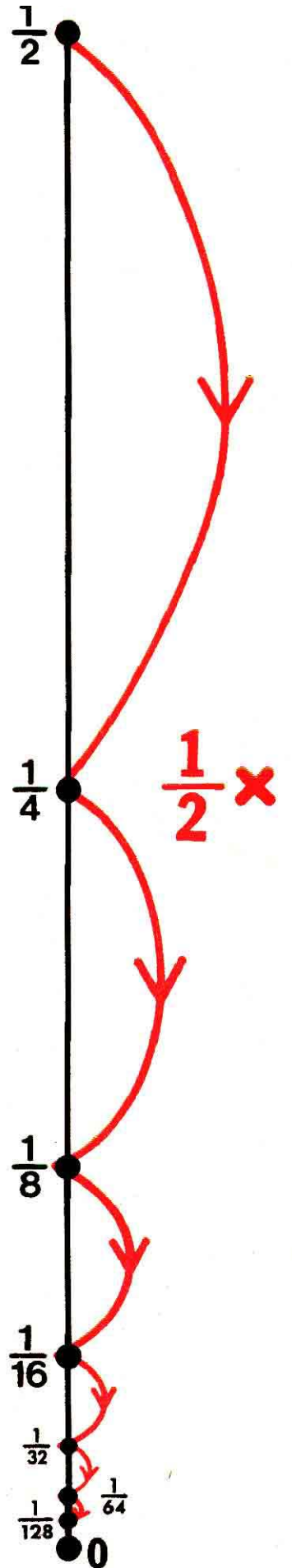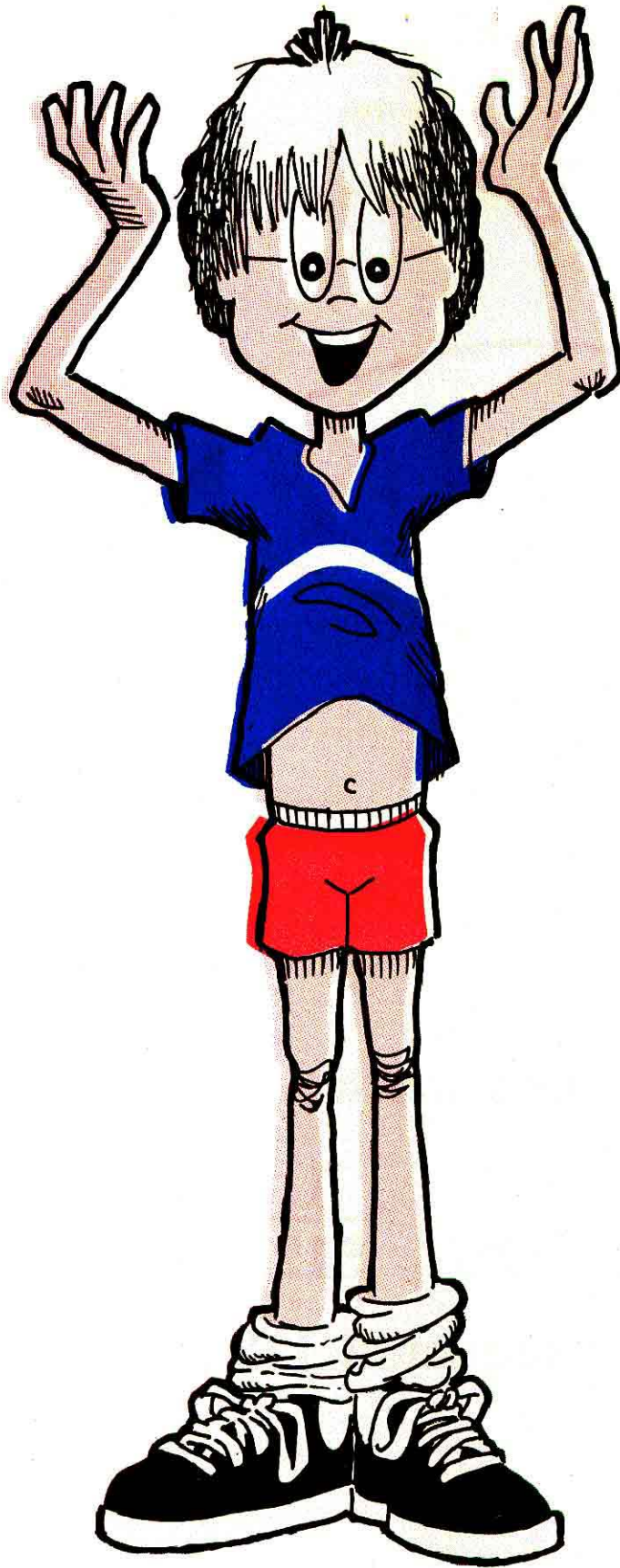"And also the numbers 1/8 and 1/16," said 8 and 16.

$$\frac{1}{2} \times$$

"You could also invite

$$\frac{1}{32} \quad \frac{1}{64} \quad \frac{1}{128} \quad \frac{1}{256} \quad \frac{1}{512} \quad \frac{1}{1,024}$$

and so on," suggested 1/2, very excited.

$\frac{1}{2}$

$\frac{1}{4}$

$\frac{1}{2}\times$

$\frac{1}{8}$

$\frac{1}{16}$

$\frac{1}{32}$

$\frac{1}{64}$

$\frac{1}{128}$

0

"1/4   is halfway between 0 and 1/2;
1/8   is halfway between 0 and 1/4;
1/16   is halfway between 0 and 1/8;
1/32   is halfway between 0 and 1/16;
1/64   is halfway between 0 and 1/32;
1/128 is halfway between 0 and 1/64;
1/256 is halfway between 0 and 1/128;
1/512 is halfway between . . ."

sang 0, overcome with pride.

"Your new dance is beautiful,"
concluded 1/2.

In SINGING FRIENDS, *the personification of numbers introduces the "games" of mathematics into one of the most important domains of childhood — the world of fantasy. The behavior of the stars of the story, 0 and 1/2, closely parallels their dynamic roles in mathematics. In this and other storybooks, 0, bold and self-confident, plays an important role in many mathematical games, and little 1/2, so quick to cry, struggles to find an identity among the solid whole numbers with their simple, but sometimes boring, dances.*

The games in SINGING FRIENDS are of two kinds. At first the numbers are exuberant and their games suggest to the young child a first notion of infinity as larger numbers dance right off the page in unending snake dances. Then, in a quiet interlude, a small group of friends sits together thoughtfully and ponders the meaning of their relationship to one another. Finally, in a game designed to include 1/2, some numbers race toward 0 in a futile attempt to reach their leader, and this time, smaller and ever smaller numbers form an infinite line of players.

Young readers of SINGING FRIENDS will meet some numbers they may not already know and perhaps these new numbers will remain in their fantasy world as lifelong friends.

Ann Karmos

STORIES BY FREDERIQUE

Ages 5 to 8

The Playful Numbers
The Baby Is Born
81 Roses
One Out of Seven
The Old Shoemaker
I Am A Very Happy Boy
The Little Dreamer
Two by Two
The Weird Story of 24
Where's My Nose?
The Happy Puppet
The Magic Box
Summer School in the Old Days

Ages 8 to 12

The Little Donkey
Singing Friends
Dancing Friends
I Am Not My Name
The Living Lines
The Square Trap
Nabu Wins an Award

Ages 10 to 14

The Hidden Treasure
A Valentine Mystery
Election in the Number World
A Very Strange Neighborhood