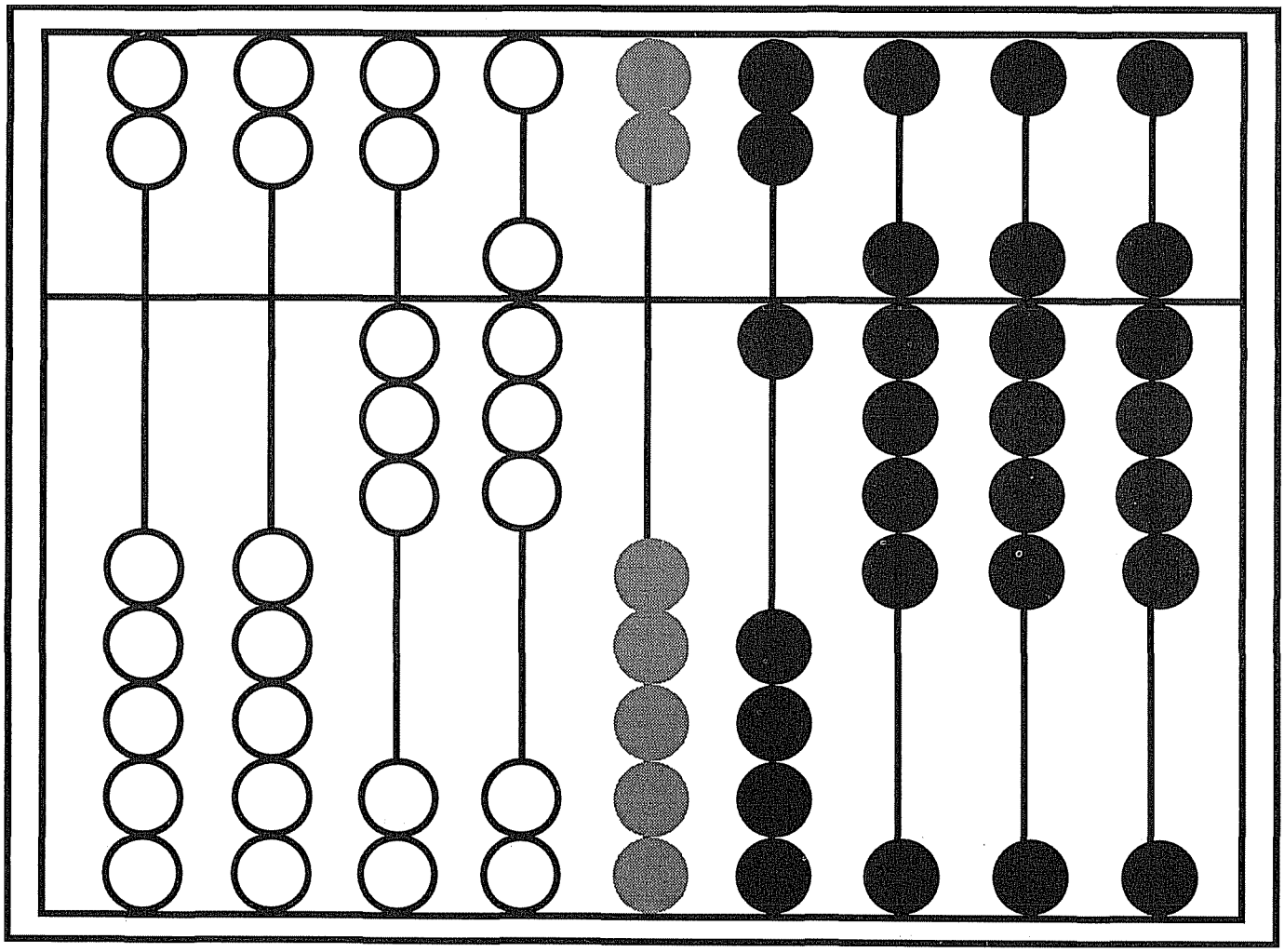
Abacus

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Edited by Frances Schatz

From the Editor's Desk

Today (mid October Thursday) found me being a vendor at the local farmer's market and answering elementary school students' questionnaires about apples. I'm not sure which was harder today, selling apples or answering children's questions. But the day made me think about *Abacus* notes. The challenge is I am a mathematics teacher who usually thinks metric except when handling farm produce. Here are two of the questions I was asked and my answers.

1. Which weighs more? 5 pounds of apples or a six-quart basket of apples?

   Answer I gave: By weight I assume you mean mass. 1 pound is 0.54 kg, 5 pounds is about 2.5 kg. 1 quart is about 1.1 litres so 6 quarts is about 6.6 litres. How do litres and kilograms compare? We really cannot compare the two measures because we must remember that 5 pounds is weight (does not consider air space) while a 6-quart basket of apples (does have air space). Hold 5 pounds of apples in one hand and 6 quart basket in the other and they will feel equal. (The grade eight student wasn't sure if he agreed with me or not. He went on to ask another vendor.)

2. What is the price for one apple?

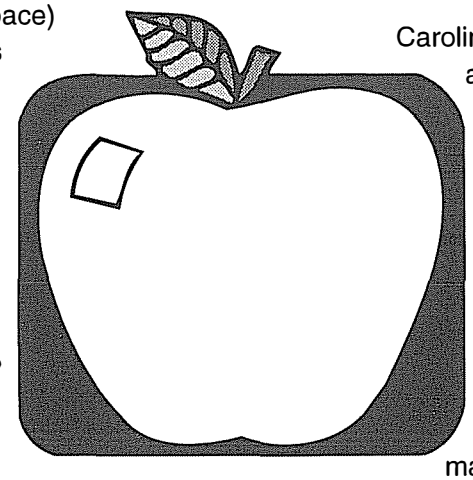
   My Answer: The 3-litre basket for $2.00 has sixteen apples so that is 12.5 cents per apple. The 6-quart basket is $4.00 and holds 35 apples. That is 11.4 cents per apple.

   What do you think should be the price for one apple? (I was amazed by the grade four student's answer -ten cents for a small apple and fifteen cents for a big apple. She noticed that the apples were not all the same size.)

Joanne Harris, Centennial Middle School, Georgetown, Ontario has three "Calendar Activities". For the Expectations Joanne has selected a variety from primary to intermediate to try to show that the activities can be used for a variety of purposes at different grade levels.

At OAME '99, **Caroline Rosenbloom, program leader mathematics for Toronto District School Board**, gave a workshop called *Making It Happen* with colleague Rochelle Williams.

In this issue you will find highlights of this workshop. Her *Integrated Strand Activities* give excellent project ideas for students from grade four to eight. These suggestions give lots of ideas for students to discover mathematics at work in their lives. Caroline also had a great activity for Geometry and Spatial Sense. A geoboard with elastic bands or pattern blocks could be used to simulate *How Much Do I Cost?*



Caroline's opening cartoon was a picture of a math book with cookies popping out of the page and the quote: 'Our new math book not only remediates, diagnoses, analyses and tests, it also contains fifty quick and delicious recipes for today's on-the-go teacher!'

Several teachers have told me that Statistics Canada provides activities suitable for all levels of data management and probability. You can access the site at **http://www.statcan.ca/start.html**.

Thank you Caroline and Joanne for providing some refreshing ideas to use in the classroom.

This issue concludes with **Abacus Part 2**.

Remember, K-8 teachers,* ABACUS *is always looking for your submissions of classroom ready activities.

Frances Schatz

Answer Key

Answer to Calendar Trick II Sum is 9x

▲ TEACHERS NOTES:

Calendar Activities Teacher Notes

by Joanne Harris

The history of Mathematics is sprinkled with references to the development of the calendar and it's modifications and changes over the centuries. As we enter the 21st century attention will be given to the calendar for the new millennium. Calendars, old and current, can be used for magic tricks, to create and solve puzzles, and to provide sources of patterns.

SUN	MON	TUES	WED	THURS	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Expectations: Grade 3 Number Sense and Numeration: mentally add and subtract one-digit and two-digit numbers.

Grade 5 Patterns and Algebra: analyse number patterns and state the rule for any relationship.

Grade 8 Patterns and Algebra: find patterns and describe them using words and algebraic expressions.

Calendar III: Perpetual Cubes

For this activity the students can be challenged to identify what numbers from 0 to 9 must be put on each face of two cubes in order to make a calendar that will display any date from 01 to 31. Or the students may be given a sketch of the two cubes and asked what numbers must appear on the sides that can't be seen in order to be able to use the cubes to create every date in the month.

Expectations: Grade 3 Geometry and Spatial Sense: sketch a picture of a model created from three-dimensional figures.

Grade 5 Geometry and Spatial Sense: sketch the faces that make up a three-dimensional figure by looking at a three dimensional figure.

Grade 7 Geometry and Spatial Sense: sketch front top and side views of three-dimensional figures with or without the use of a computer.

Patterns

Have students look for patterns with the days of the week and dates. Is there at least one month of the year that starts with each day of the week? Is the pattern the same in a leap year as it is in a non-leap year? (In a leap year there is one month that starts with each day of the week, in a non-leap year there is one day that does not start a month.)

What months start with the same day of the week? Is the same in a leap year? Is it the same for years that start on different days of the week?

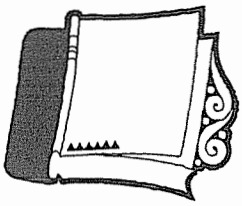
Select a month. What week has the largest sum? What week has the smallest sum?

How many master calendars would you have to have in order to account for every possible day and date combination? (7 leap year and 7 non-leap year)

Expectations: Grade 2 Patterning and Algebra: describe and make models of patterns encountered in any context, and read charts that display the patterns.

▲ Multiple Intelligence Activities: Mathematics at Work

By Caroline Rosenbloom



Verbal Linguistic

Write a short story that describes how you use mathematics in your day-to-day activities at home and at school.



Logical/Mathematical

List 5 different careers. Think of key math concepts that would be required for these careers. List the concepts in order of importance for each career.



Visual/Spatial

Create and conduct a survey of different workers in your school or community to determine different ways that math is important to many jobs.



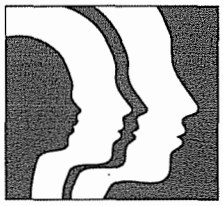
Body/Kinesthetic

Create or design a carnival that requires you to apply several different math concepts.



Musical/Rhythmic

Discuss the many ways that math is important to a songwriter, to a conductor, and to a critic of musical productions.



Interpersonal

Assign roles to a group of students to organize a party for your class. Each group must submit a report that includes a description of the role and a description of how math was used to complete the task.



Intrapersonal

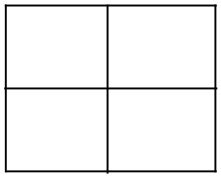
Write a journal entry that tells how numbers are important in your life.

▲ CALENDAR WORKSHEET

SUN	MON	TUES	WED	THURS	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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1. Calendar Trick I

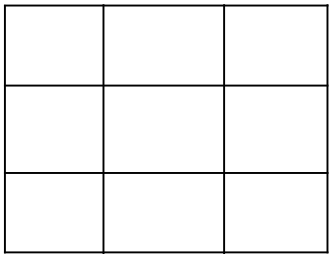
A. Draw a square around any four numbers on the above month of a calendar.



B. Using sum or difference, can you produce a number pattern with these numbers? Describe the pattern.

C. Test your pattern with other boxes of four numbers in the above month.

2. Calendar Trick II



A. Draw a square around any nine numbers on the above month (or any month of your choosing).

B. Find the sum of the nine numbers.

C. The clairvoyant divides that sum by 9 and arrives at the middle number in the square. Explain why it is always true.

Example:

4	5	6
11	12	13
18	19	20

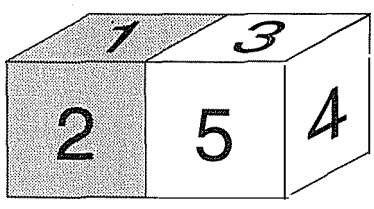
x-8	x-7	x-6
x-1	x	x+1
x+6	x+7	x+8

Sum is _____.

Calendar III: Perpetual Calendar Cubes

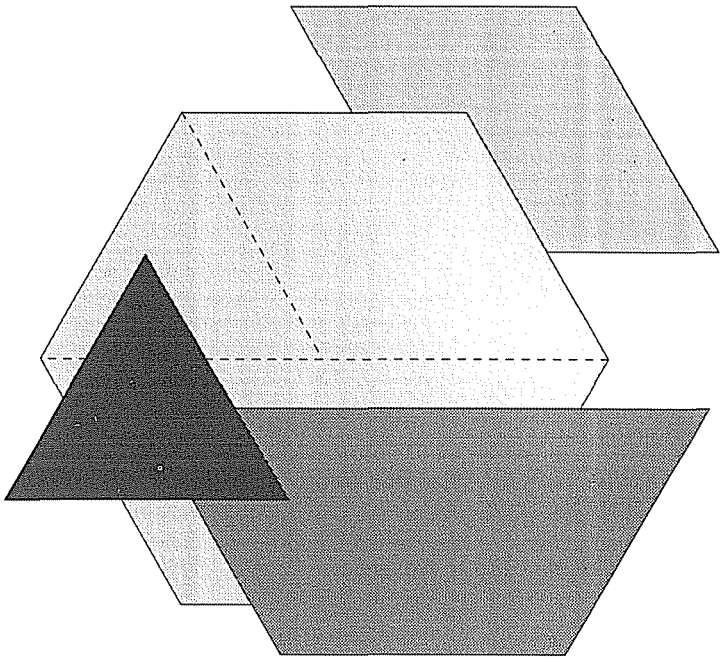
What digits are found on the other faces of the cube?

Each cube must have 0,1, and 2. As each cube has six faces, there are six faces on which to place the remaining seven numbers 3, 4, 5, 6, 7, 8, & 9. By reversing the 6 a 9 may be created.
Therefore one cube can have 0, 1, 2, 3, 4, & 5 and the other can have 0, 1, 2, 6, 7, & 8.

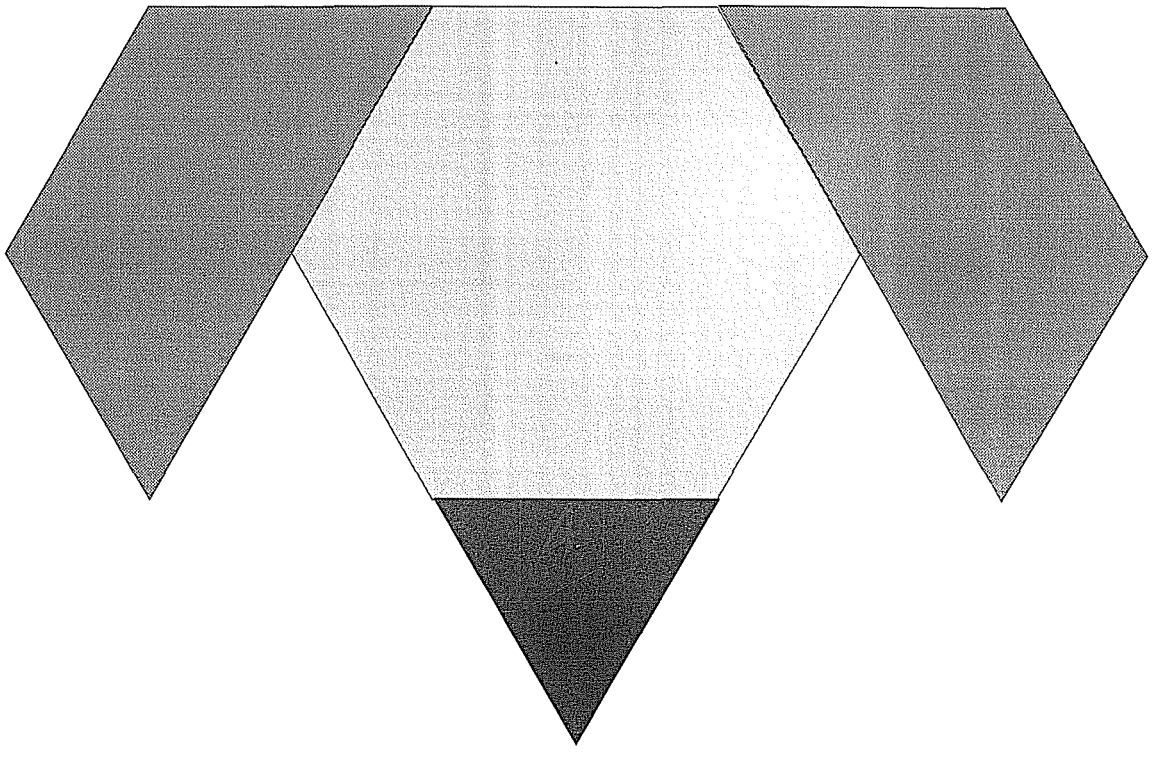


▲ How Much Do I Cost?

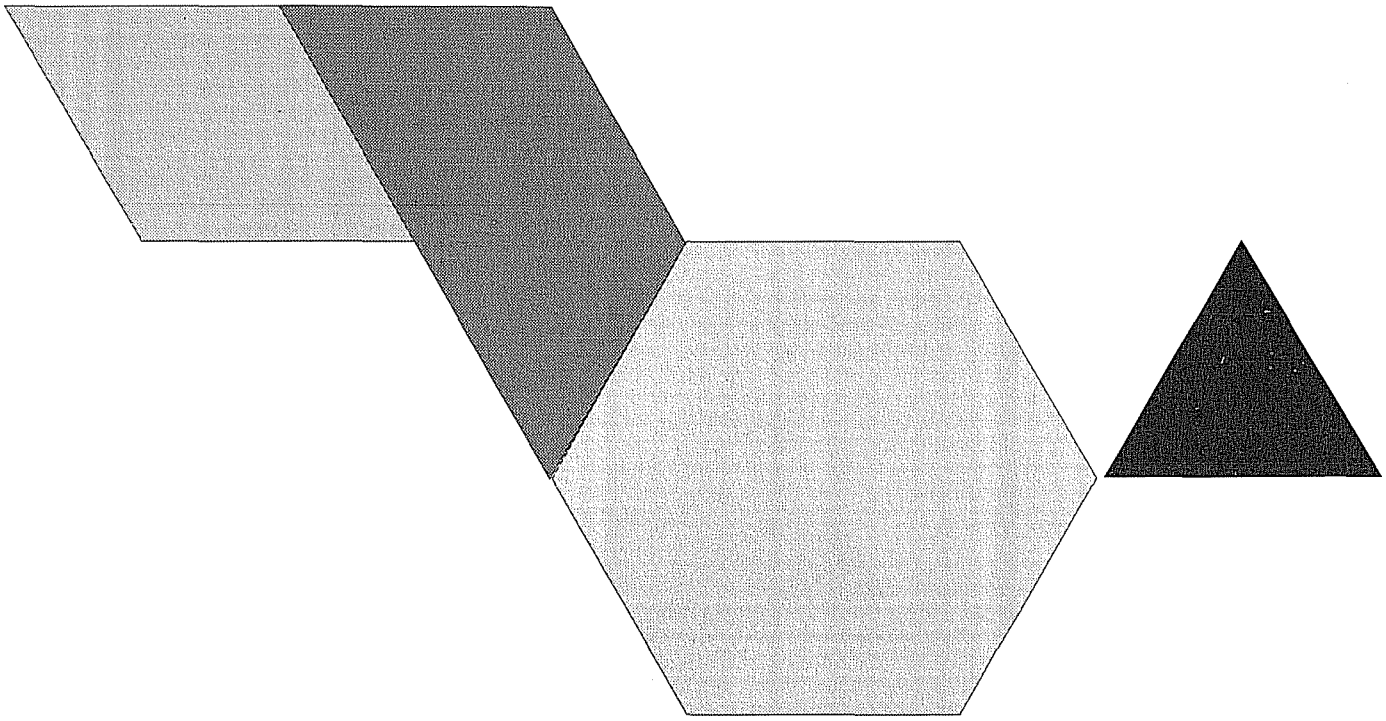
If the trapezoid costs $1.05, how much do each of the other figures cost?



How much do I cost?



How much do I cost?

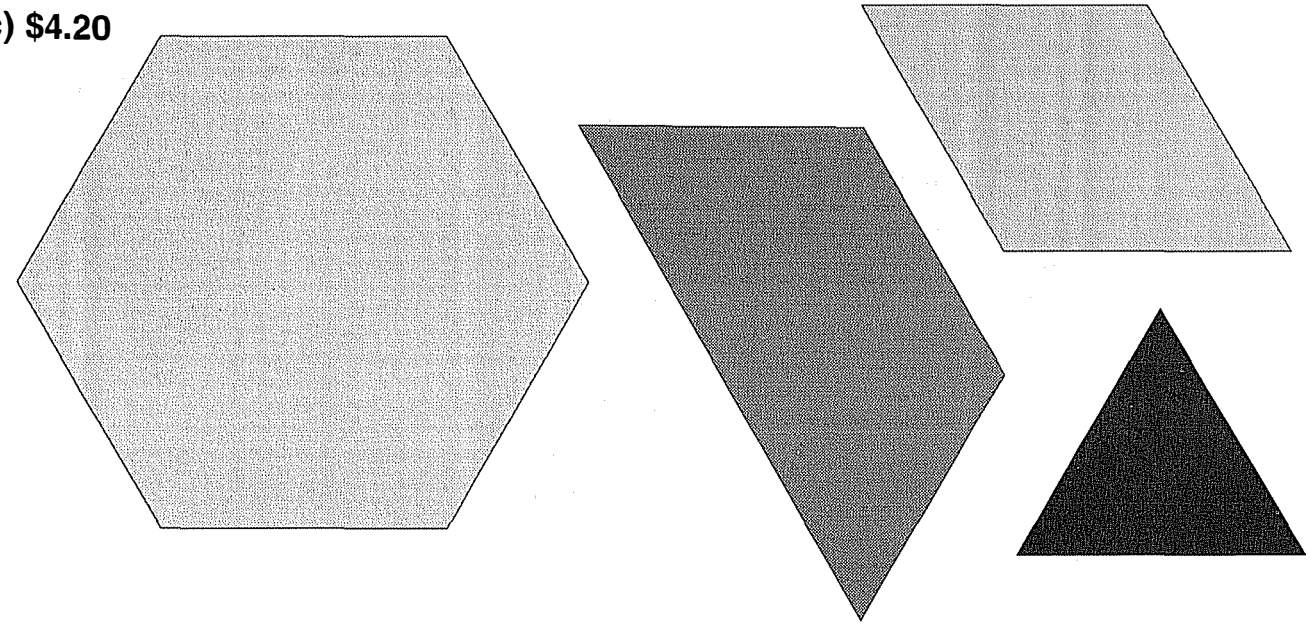


Create a shape worth:

a) $1.40

b) $3.50

c) $4.20

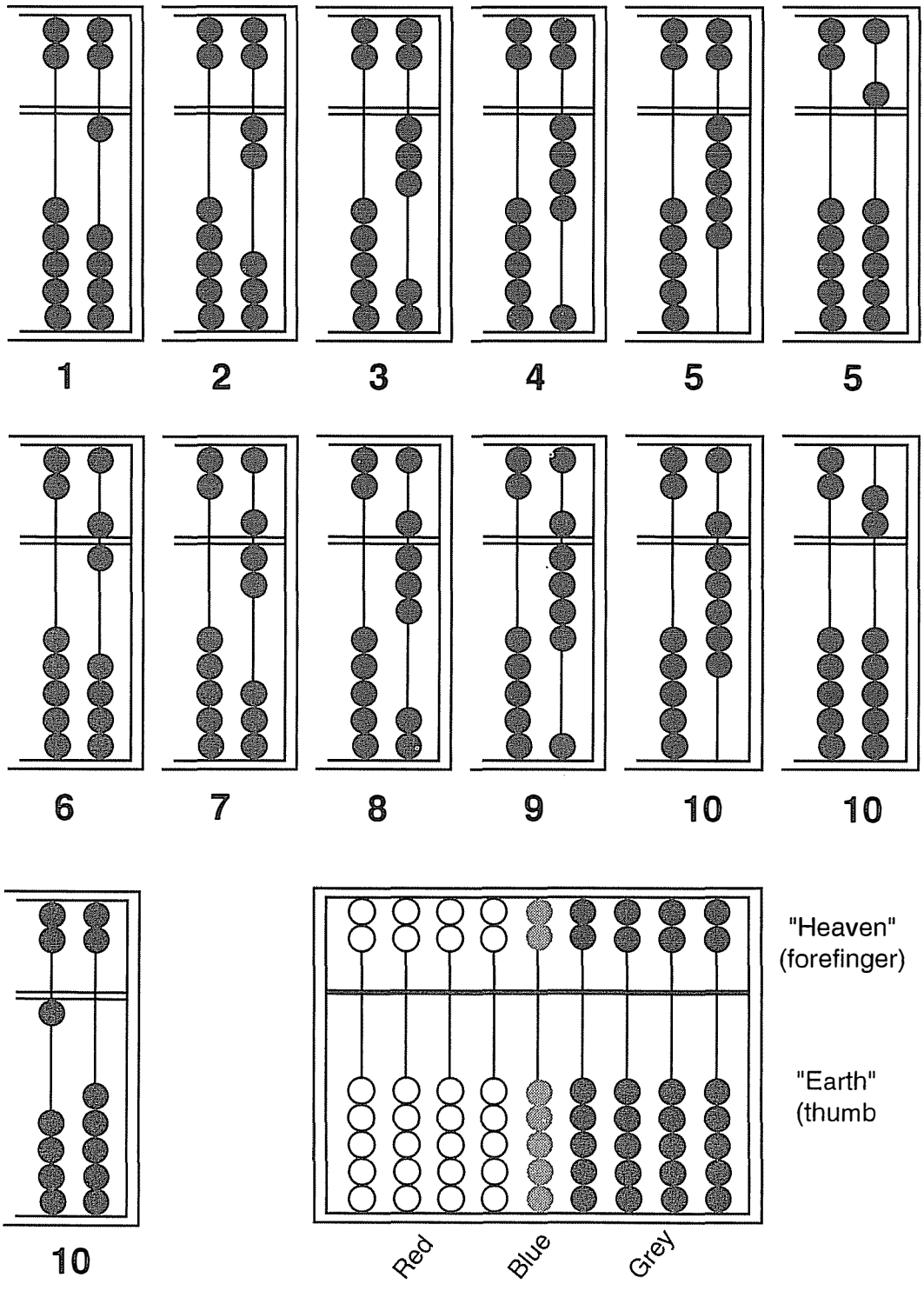


ABACUS: PART II – A LITTLE HISTORY

By Frances Schatz

Fingering for the Abacus

Lay the abacus on a flat surface in front of you. You will use the thumb and forefinger of each hand. Let the other fingers stay out of the way. The thumb controls earth while the forefinger controls heaven. The left hand can also steady the abacus on the flat surface. Here are the representations for the numbers 1-10 on the right side of the abacus.



Part 3: Addition on the Abacus will be continued in next issue.