Sunshine Math
Superstars III

Uranus
Grade 6

Neptune
Grade 7

Saturn
Grade 5

Pluto
Grade 8

Jupiter
Grade 4

Mercury
Kindergarten

Mars
Grade 3

Venus
Grade 1

Earth
Grade 2

Venus
Grade 1

Acknowledgments

Preface

Sunshine Math and its predecessor programs, *Superstars* and *Superstars II,* dwell on the positive aspects of students, parents, teachers, and administrators working together. This program assumes that children, even young children, are capable of and interested in learning; that teachers want to help them learn to think for themselves; that administrators see their jobs as clearing the path so that quality education is delivered effectively in their schools; and that parents care about their child's learning and are willing to work with the school system toward that goal. Each of these four groups has a vital role to play in implementing *Sunshine Math.*

The program's initiators believed that elementary students are capable of much more than we normally ask of them, and the subsequent success of *Superstars* indicates that many children are on the path to becoming independent learners. A number of children in *any* classroom are bright, energetic, and willing to accept extra challenges.
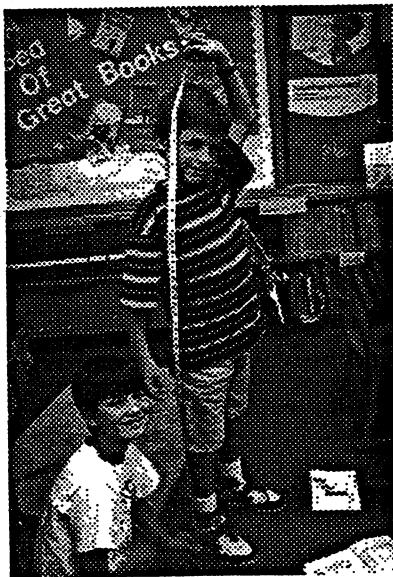
The basic purpose of the *Superstars* program is to provide the extra challenge that self-motivated students need in mathematics, and to do so in a structured, long-term program that does not impinge on the normal classroom routine or the time of the teacher. The system is not meant to replace any aspect of the school curriculum -- it is offered as a peripheral opportunity to students who identify with challenges and who want to be rewarded for their extra effort. Participation in the program is always optional -- only those students who voluntarily choose to participate will, in the long run, benefit from this program. Any student, regardless of prior academic performance, should be encouraged to participate as long their interest is maintained.

The predecessor programs for *Sunshine Math* - the Florida Department of Education's *Superstars II* and *Superstars*-- have demonstrated that this concept can be extremely successful. What is required are several dedicated adults who devote a few hours each week to operate the system effectively in the school; an administrator who provides highly visible support; teachers who welcome a supplementary experience for their students to engage in higher-order thinking; and a typical classroom of students. If all of those ingredients are present, *Sunshine Math* will become an integral part of the school fabric.

Organization of These Materials

Section I   **Description of the *Sunshine Math* Program**

        1. General Information
        2. Information/checklist for principals
        3. Information/checklist for assisting adults
        4. Information for teachers
        5. Letter to participating students and their parents

Section II   **Student worksheets for *Sunshine Math***

Section III   **Commentary for student worksheets for *Sunshine Math***
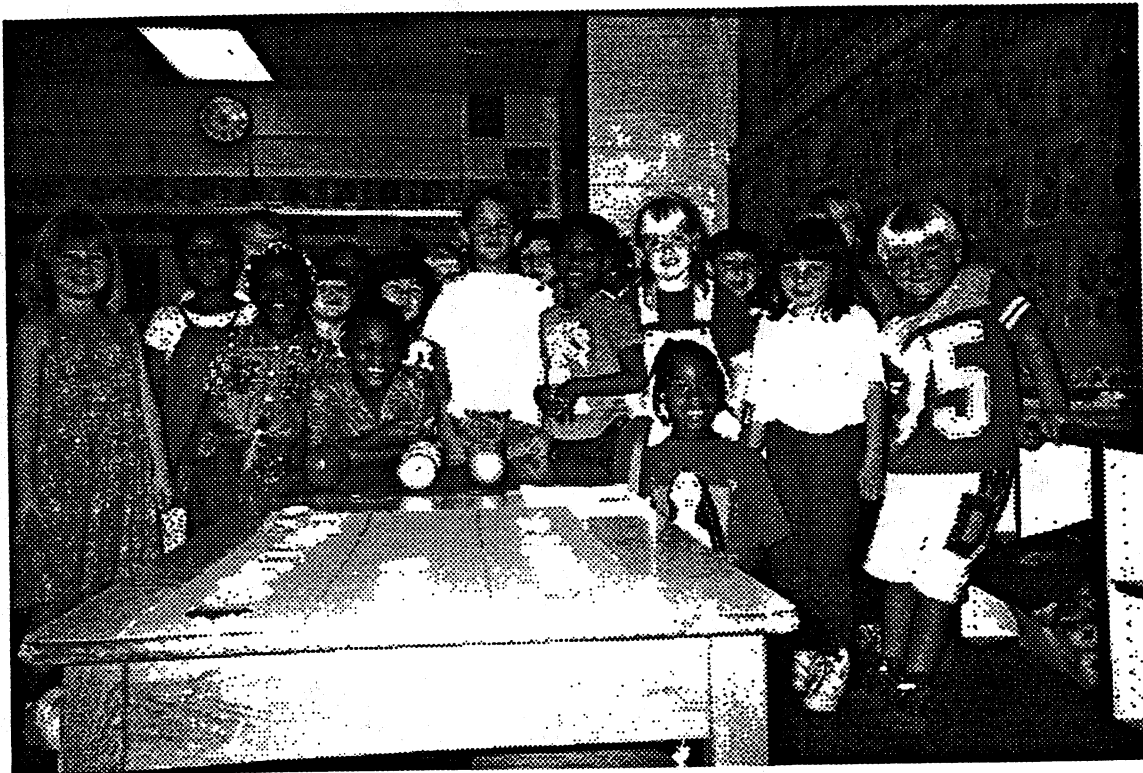
Sunshine Math General Information

Sunshine Math is a K-8 program designed as an enrichment opportunity for self-directed learners in mathematics. The levels of the program are named after the planets of our solar system:

Kindergarten	Mercury	Fifth Grade	Saturn
First Grade	Venus	Sixth Grade	Uranus
Second Grade	Earth	Seventh Grade	Neptune
Third Grade	Mars	Eighth Grade	Pluto
Fourth Grade	Jupiter		

Students of all ability levels choose on their own to participate in *Sunshine Math*. The visual reinforcement of seeing their names displayed in a prominent place in the school, with a string of stars indicating their success, is the reward a student receives for the extra work. In many cases, the school decides to enhance the basic reward system by awarding certificates or other forms of recognition for achieving certain levels of success in *Sunshine Math*.

Sunshine Math can function in a school in a number of different ways. The "tried and true" way is for assisting adults (volunteers, aides, etc.) to manage the program for the entire school, with support provided by school administrators and classroom teachers. This system has been modified at the school level, with varying degrees of success, over the years. The basic model for running *Sunshine Math* is discussed below, with variations described on the next page.

The Basic Model

The basic model for *Sunshine Math* is for a school to establish a weekly cycle early in the fall, according to these guidelines:

> On Monday of each week, student worksheets are distributed by the assisting adults to those in the program. Students have until Friday to complete the problems, working entirely on their own. On Friday, the classroom teacher hosts a brief problem-solving session for the students in the program. The more difficult problems on the worksheet for that week are discussed, with students describing their thinking about how to approach and solve the problems. They do not give their answers for the problems, only their strategies.
>
> Students get double-credit for problems they complete prior to the problem-solving session, and regular credit for those they complete successfully over the weekend. On Monday, all papers are handed in, checked by the assisting adult, and stars are posted for problems successfully worked. This completes the cycle for the preceding week, allows for the new worksheets to be passed out, and the cycle begins again.

Sunshine Math is not for every child -- it's only for those who are self-motivated and who are not easily frustrated by challenging situations. This does not diminish the value of the program, but rather makes us realize that there are children of all ability and socio-economic levels who are self-directed learners and who need challenges beyond those of the regular school day. These children will shine in *Sunshine Math*.

Variations of the Basic Model

The first variation that has been used successfully retains the weekly cycle and assisting adult role as in the basic model. However, the teacher involves the entire class in the problem-solving discussions. For example, the teacher might pick the four hardest problems on the worksheet for that week, and do a "parallel problem" with the entire class to open the mathematics class on Tuesday through Friday. Using this variation, all students are exposed to the problem-solving strategies, but only those who are in *Sunshine Math* exhibit that they have learned the material by completing the worksheet over the weekend.

A second variation is for the assisting adults to run the entire program, including the problem-solving session for students. This method has been used in situations in which some teachers in a school lacked commitment to the program, and thus it was being implemented inconsistently. In such cases, the assisting adults must have a progressive view of what constitutes problem solving in elementary mathematics. They must also be given extra assistance from the principal to ensure students are released from class and that the process works smoothly in general.

Yet another variation is for a parent to run *Sunshine Math* at home, for their own child. The basic rules are the same -- a child gets the worksheet once a week and time to work the problems alone. The parent has a pre-established night to listen to the way the child thought about each problem, interjecting her or his own methods only when the child seems stuck. The reward system is basically the same -- stars on a chart -- but is usually enhanced by doing something special for the child, such as a trip to the movies or to the skating rink, when the child reaches certain levels of success. If this method is adopted, the parent must be sure not to try to "teach the child." *Sunshine Math* is a program designed to stimulate discussion of problem-solving strategies; it is not a program designed for adults to "teach children how to think."

Other variations abound. The basic model on the previous page is the approach that reaches more children in a consistent fashion than any of the other methods. However, individual schools, teachers, or parents are encouraged to get some version started, even if it's not one of the above. Some sunshine is better than none at all!
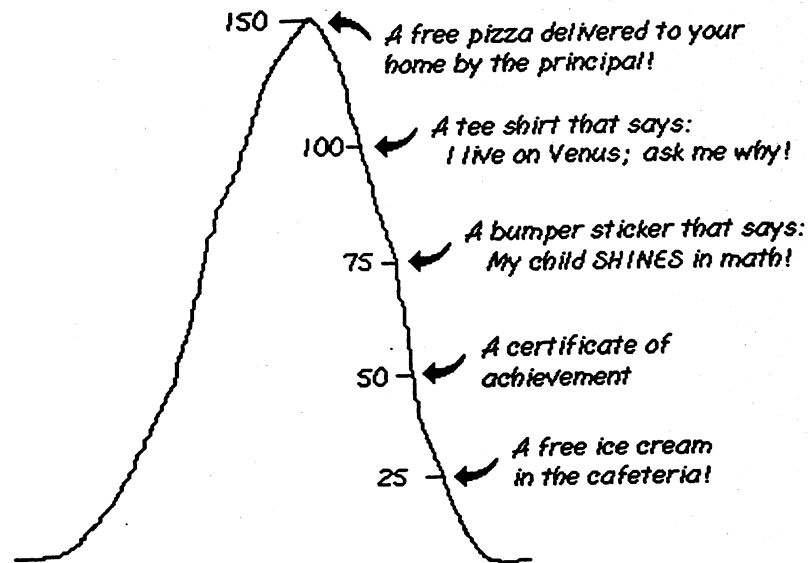
Sunshine Math: Information for Principals

Sunshine Math is a K-8 enrichment package for mathematics, designed to be managed by volunteer assisting adults with coordinated support from the classroom teacher and school administrators. The purpose of the program is to give self-motivated students of all ability levels a chance to extend themselves beyond the normal mathematics curriculum. The complete set of materials comes in nine packages, one for each K-8 grade. The grade levels are named for the planets in the solar system, in order starting from the sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.

Your support is vital if this program is to succeed. As the school administrator, you need to stay in close touch with *Sunshine Math*. A "checklist for success" follows:

❑ Become familiar with the philosophy and component parts of the program.

❑ Introduce *Sunshine Math* to the faculty early in the school year. Ensure that each teacher understands the philosophy of the program and has a copy of the student worksheets and commentary for that grade level.

❑ Speak to parents at your school's first "open house" of the year, explaining the purpose of *Sunshine Math* and the long-term value of children working independently on the worksheets.

❑ Recruit several assisting adults (PTA members, aides, senior citizens, business partners, churches, and so on) who are enthusiastic, dependable people to manage the program. Early in the year, meet with these assisting adults to plan such details as:

    ✔ A prominent place and format for the STAR CHART.

    ✔ A designated time each Monday and Friday for the assisting adult to be in the school to receive and distribute papers from students, and post stars.

    ✔ A system for the activity sheets to be duplicated each week.

    ✔ A plan for extra incentives for accumulating stars. ("World records" to be kept from year-to-year; a celebration day planned for the end of school; students earning prizes for attaining certain levels of success -- see the reverse side of this page for examples.)

    ✔ A schedule for when the program will begin, and whether or not there should be a "start over" point at some time in the school year. Review a school calendar, and use only weeks that have at least four school days in them. If there isn't time in the school year to cover all the activity sheets under these conditions, decide which sheets to eliminate or when to "double up."

    ✔ If possible provide volunteers with a *Sunshine Math* cap, name tag, tee-shirt, or other identifying feature.

❑ Monitor the program every two weeks to clear up any unforeseen problems. Administrators need to be highly visible for *Sunshine Math* to succeed.

Sunshine Math is an optional program for students. It should be available to any student who wants to participate, regardless of prior success in mathematics. A large number of students will usually begin the program, but a majority of them will lose interest. However, a significant number of students will continue their interest over the life of the program. This is normal and simply means that *Sunshine Math* is successfully addressing the needs of the self-directed learner.

Visual reminders help children see that mathematics is challenging and rewarding. Some ideas are presented below, merely to start your creative juices flowing:

150 — A free pizza delivered to your home by the principal!

100 — A tee shirt that says: I live on Venus; ask me why!

75 — A bumper sticker that says: My child SHINES in math!

50 — A certificate of achievement

25 — A free ice cream in the cafeteria!

Climb the Mountain this Year!!!
Join the Sunshine Math Club

Tom Walker, Principal at Bashaw Elementary School in Bradenton, passes out awards to students for achievement levels in SUPERSTARS.

Sunshine Math: Information for Assisting Adults

Sunshine Math is designed to give assisting adults a well-defined role to play in the school's mathematics program. The success of *Sunshine Math* depends on a team effort among teachers, administrators, parents, and you. Reliability and punctuality are important -- students will rapidly come to depend upon you to be there as scheduled, to check their papers and post their stars, and to listen to alternate ways in which they may have interpreted a problem to arrive at a unique answer. If possible, wear an outfit that fits with the *Sunshine Math* logo; students will quickly begin to identify you as an important person in their school.

Sunshine Math works on a weekly cycle. Each Monday, you collect the worksheets from the previous week and distribute new worksheets to the participating students, all from your *Sunshine Math* area of the school. Allow students to see the answers to the problems, and discuss any for which they arrived at a different answer, giving them credit if their interpretation and reasoning are sound. You then check the worksheets from the previous week, and post the stars earned on the STAR CHART.

Participating students have from Monday until Friday to work the problems entirely on their own -- the only help they can receive during that time is for someone to read the problems to them. On Friday, the teacher hosts a problem-solving session in the classroom, having students describe their approaches to the more difficult problems. Students who have already worked the problems discussed, prior to the problem-solving session, can earn double stars -- you can identify these by looking for the teacher's initials beside certain problems. The students will have the weekend to complete any problems they want to -- for successfully completing these problems, they earn the indicated number of stars.

Be creative when designing a star chart. The basic method of posting stars individually is a good way to begin, but eventually you will want a color-coded system, or perhaps posting only one star each week, with a number in its center. Personalize the chart and the entire *Sunshine Math* center with pictures of students, "smiling faces," and so on. Occasionally bring in a reward for each child -- perhaps a cookie or a hand stamp in the shape of a star -- just for turning in their worksheet. Be creative and enjoy your role -- you are helping enthusiastic students develop higher-level thinking skills!
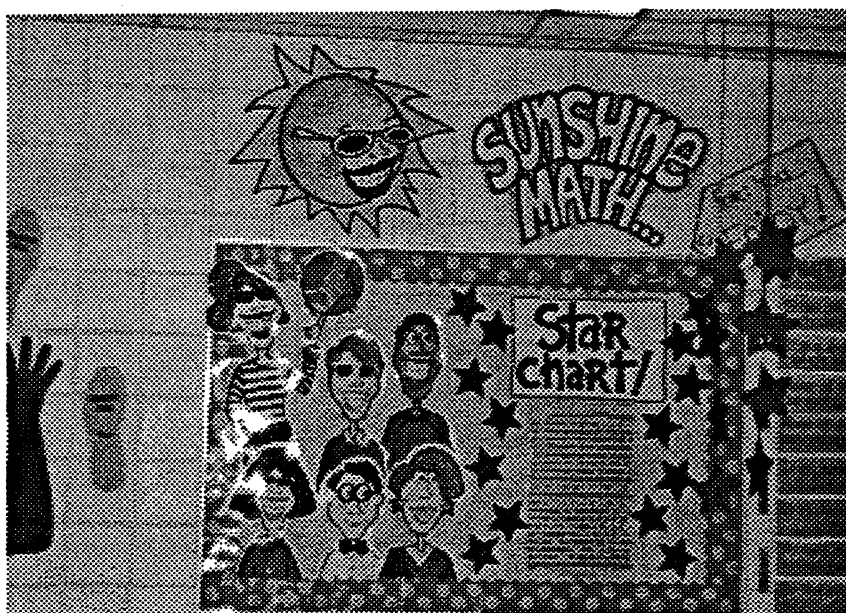
Checklist for assisting adults:

❑ Plan with the principal the following:

   ✔ A prominent place and format for the STAR CHART.

   ✔ The time and place for you to take up and check papers, and distribute new worksheets.

   ✔ The system for duplicating worksheets each week, ensuring legible copies.

   ✔ Any extra incentives ("world records," stickers, coupons, pencils, tee shirts, etc.) that will be part of the system for rewarding levels of achievement in *Sunshine Math.*

❑ Make the *Sunshine Math* center a happy place. Use bright colors, smiles, and cheerful words. Show confidence, friendliness, and encouragement to students.

❑ Collect the letters which are sent home prior to the first worksheet and signed by each student and parent . If in the future you have evidence that the work turned in does not represent the thinking of the student, discuss the situation with the classroom teacher. These situations are best handled individually in a firm, consistent manner.

❑ Check the worksheets from the previous week consistently. If you give partial credit for a problem with several parts, do so in a fair way that can be explained to students. Do not award partial credit for problems with only one answer.

❑ Have answer sheets available and encourage students to look at the answers when they hand in their worksheets. Allow them to explain their thinking if they arrived at a different answer. Award them full credit if they show a unique interpretation of the problem, and logical reasoning in obtaining an answer.

❑ Leave extra worksheets with the classroom teacher for participating students who were absent on Monday. Accept a late-arriving worksheet only if the student was absent on Monday. If a students' name is missing, or on the wrong place on a worksheet, check the paper but award the stars to "no name" on the STAR CHART. Adhering strictly to these rules will rapidly teach responsibility to the students, and keep your work load manageable.

❑ Keep all returned worksheets. As the same worksheets are used year-after-year, and many participating students have siblings who will later be in *Sunshine Math*, it is important that the students not be allowed to keep their worksheets.

❑ On weeks when *Sunshine Math* will not be available, post a sign such as "No star problems this week, but please come back after the vacation for more!"

Sunshine Math: Information for Teachers

Sunshine Math is a program designed to complement your regular classroom mathematics curriculum. It offers a peripheral opportunity for students to practice mathematics skills appropriate for their grade level and, at the same time, to participate in problem-solving experiences. It offers a challenge to those students who are self-directed learners by giving them something worthwhile to do outside of class.

Your involvement is strictly as a teacher. *Sunshine Math* will remain special to students if it's managed by someone outside the classroom, and if the teacher is viewed as a facilitator in the system, rather than as the authority figure. Your primary role is to monitor the system in your own classroom and host a brief problem-solving session for *Sunshine Math* students on Friday of each week. You will also need to release the participating students from your class at a set time on Monday to turn in their worksheet and obtain a new one. You might make yourself a special pin like that shown to the right, to wear on Monday and Friday to remind students that those days are special.
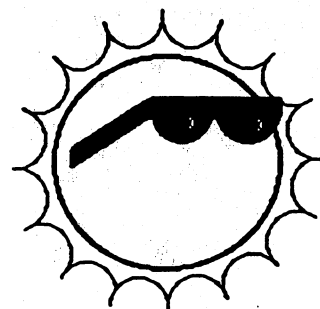
Each student worksheet has an accompanying commentary page. This sheet provides hints on parallel problems which you might use in the Friday problem-solving session. It is important that students participate actively in this session, and that you solicit from them their unique approaches to the problem discussed. Only after students present their ideas should you provide guidance on the problems, and then only when necessary. Even though there is a comment provided for each problem, you will have to decide which 3 or 4 problems you will cover during this brief session. Concentrate on those whose solution requires a strategy. The problem-solving session should last no more than 15 minutes.

Do not be disappointed if a large number of your students begin *Sunshine Math*, but many drop out after a few weeks. This is normal; problem solving requires a great deal of effort, and only certain students are ready for this challenge. On the other hand, you will also note that certain students *do* chose to stay in *Sunshine Math* week after week, even though they aren't as successful as other students at earning stars. Their participation should be encouraged, as they are certainly learning from the experience. Under no circumstances should *Sunshine Math* be reserved for only the advanced students in your class.

As a purely practical consideration, students are not allowed to discuss the problems with other students or their parents prior to the Friday "cooperative group" problem-solving session. This allows the "think time" necessary for students to develop into independent thinkers; it also prevents students from earning stars for work that is basically someone else's, which is the surest way to disrupt the entire *Sunshine Math* program. As the teacher, you must monitor this in your classroom and ensure that students abide by the established rule.

It is important that you understand and support the overall philosophy of *Sunshine Math.* Do not worry if students encounter problems for which they have not been prepared in class -- such is the nature of true problem solving. Do not provide remedial instruction to ensure that students master certain types of problems -- they will meet these same problem types repeatedly in the program, and likely will learn them on their own and from listening to other students at the problem-solving session. You should enjoy what the students *can* do, and not worry about what they can't do. You should also read over the general information about the program, to see how your role fits into the entire system.

Here are some hints that you might find useful in your support role for Sunshine Math:

- ✔ Allow your students to leave the classroom at the designated time on Monday to turn in their worksheets and pick up a new one.

- ✔ Read each week's worksheet yourself, and feel free to structure classroom activities that parallel those on the *Sunshine Math* worksheet.

- ✔ During the school week, students should be allowed to work on their *Sunshine Math* problems during their spare time, but the only help they can receive is for someone to read the problems to them. Give the students one warning if you observe them discussing the worksheets, and take away their papers for the next violation. If it happens another time, dismiss them from *Sunshine Math* for a month.

- ✔ At the problem-solving session on Friday, remember these points:

  - → Students come to this session with their worksheets, but without pencils.

  - → The session must be brief -- 15 minutes at most. Discuss only the 3 or 4 most difficult problems on the worksheet.

  - → Help students summarize their own approaches to the problems, in a non-judgmental fashion. Offer your own approach last, and only when it's different from the student strategies. Do not allow answers to be given to the problems.

  - → End the session by encouraging students to complete the problems over the weekend. Put your initials beside any problem discussed in class which a student has already completed successfully. The assisting adult will award double stars for these.

- ✔ Remember that part of the *Sunshine Math* philosophy is that students learn responsibility by following the rules of the system, if participation is important to them. *Sunshine Math* becomes very important to certain students, so they will adhere to rules about where their names goes on each paper, no credit if they forget their paper on Monday, no talking about the problems prior to the problem-solving session, etc., if *you* enforce the rules.

- ✔ Enjoy *Sunshine Math*. Students will impress you with their ability to think, and their creative ways to solve problems that appear to be above their level.

Here's a song for your students -- to the tune of "When you wish upon a star":

> When you get your SUPERSTARS .....
> It won't matter who you are ....
> Try a few ....
> See what you can do ....
> .... and ....
> Success will come to you!!!

Sandy Parker, Lake Weir Middle School, Ocala, FL

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
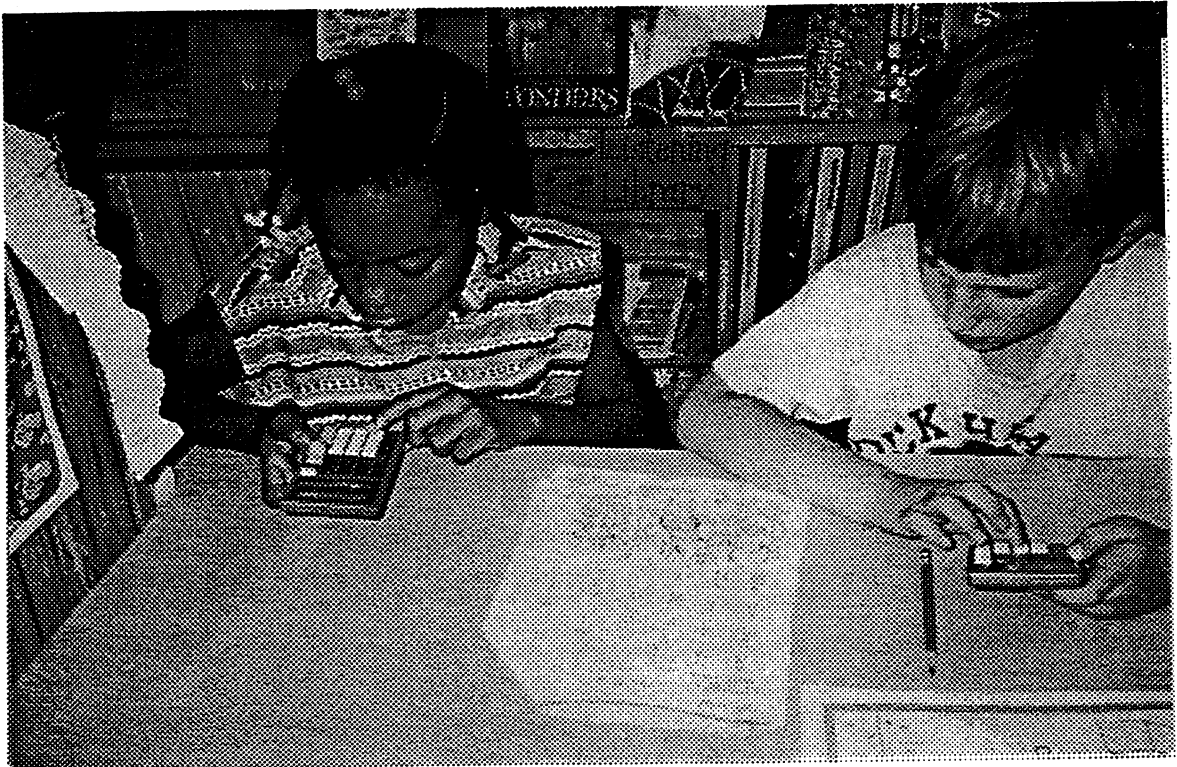
WELCOME TO *SUNSHINE MATH !* We are happy that you want to try some new and different kinds of math problems! As you read the *SUNSHINE* problems, you may find yourself *?PUZZLED?*. Your teacher will be helping you each week with some of the hardest problems. Also, your parents may read the problems to you and offer hints for solving them.

If you would like to begin earning ★STARS★ for solving math problems, sign your name below.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

(Your name)_____ I am

ready to begin the *SUNSHINE MATH* Program. I

promise to do my own thinking on each problem.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Dear Parents,

   We welcome your child and you to *SUNSHINE MATH*, a program designed to enhance your child's journey through mathematics. By expressing an interest in more challenging problem solving, your child has taken the first step toward becoming an independent learner who is able to address many types of problems.

   Your child will receive a worksheet each Monday which will be discussed on Friday and collected the following Monday. Each problem is ranked according to its level of difficulty. The more stars you see beside a problem, the higher the level of difficulty, and the more stars your child can earn for solving it.

   Each Friday, your child will attend a "help session" to discuss the most challenging problems of the week. Any problem solved prior to the help session will be given double stars, or double credit. After the session, your child may rework problems before the sheets are collected on Monday.

   Your role in *SUNSHINE MATH* is to encourage and facilitate problem solving. During the week, allow time for your child to think about each problem. You may need to read the problem to your child, explaining any new words encountered. Feel free to suggest a strategy for solving the problem, offer "counters" or manipulatives, or listen as your child shares her or his thinking, but please **DO NOT GIVE THE ANSWERS**. In order for this program to be effective, the thinking must be done by the students.

   It is normal for a child NOT to be able to complete every problem on a worksheet. The process of reading, understanding and approaching the problems is a valuable step in solving many types of problems. Remind your child that she or he is not expected to know the answers to every problem.

   Thank you for allowing your child the chance to embark on this mathematical adventure. Your signature gives permission for your child to begin.

_____
(parent's signature)

14

WORKSHEETS

SUNSHINE MATH - 1
Venus, I

(This shows my own thinking.)

★★   1. Sasha needs 🍓🍓🍓🍓🍓🍓🍓🍓🍓🍓🍓🍓🍓.

She has 🍓🍓🍓🍓🍓🍓🍓.

How many more must she get?

Answer: _____ 🍓

★   2. Five little 🦋 flying high.

Seven more come to sit nearby.

How many 🦋 in all?

Answer: _____ 🦋 in all

★★★ 3. Amanda reads 2 books a week.

How many books does she read
in 6 weeks?

Answer: _____ books

16

★★ 4. Julio will use the spinner to find out what pet his parents will buy. Which pet will he probably get?
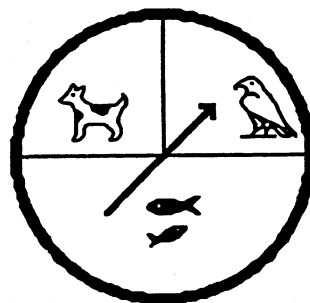
Circle the answer.

dog   bird   fish

★★ 5. Make a graph to show the birthdays.
Draw a ☺ for each child.

September:

October:

November:

Fall Birthdays

September								
October								
November								

★ 6. Draw the picture that comes next:

_____
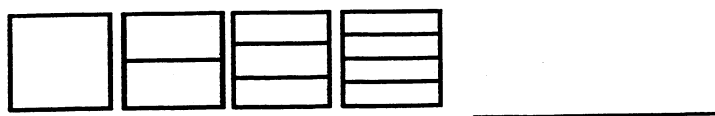
SUNSHINE MATH - 1

Venus, II

*Name:*_____

(This shows my own thinking.)

★★ 1. Which piece will make this shape if
you have more than one of them?
Circle the answer.
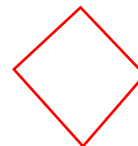
      A.   B.   C.

★★ 2. You spent exactly 33¢. Circle the two things that
you bought.

33¢   20¢   12¢

15¢   10¢

18¢
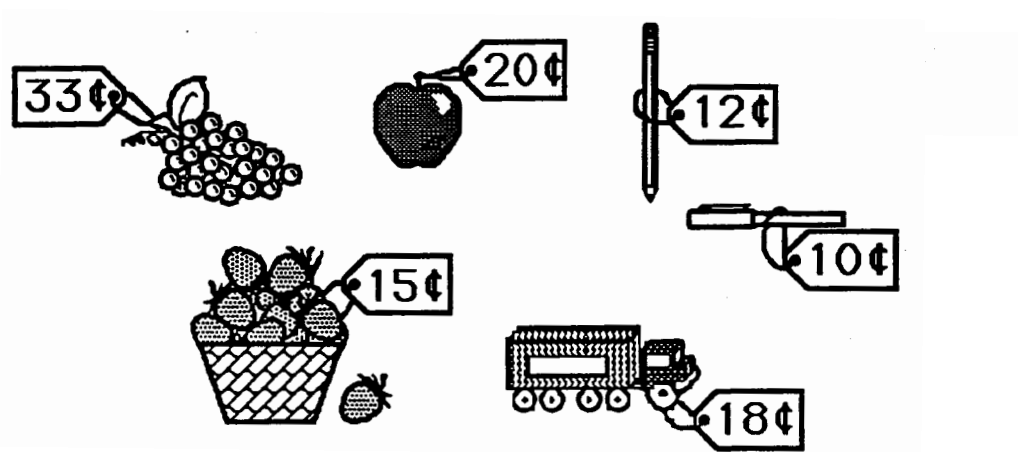
★ 3. Which tile has a different number of dots than the
other tiles? Circle the one that is different.

18

★★★ 4. Five scarecrows had a candy corn eating contest.

Ben ate the most candy corns.
Jen ate more than Len.
Jen ate less than Ken.
Zen ate less than Len.

Write the scarecrows'
names in order to show
how much candy corn
they ate.

Answer: _____ _____ _____ _____ _____
              most   least

★ 5. Write a number sentence to show how far the rabbit jumped.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Answer: _____

★★★ 6. Find the mystery number.

Answer: The number is ____.

Add me to myself.
Then add 2 more.
You will get 14.
Who am I?

19

SUNSHINE MATH - 1
Venus, III

(This shows my own thinking.)

★   1. I am a number. Subtract me from 12 and get 9.
         Who am I?

                              Answer:_____

★★★ 2. Draw a square in the box to
         the right. Begin with the
         part given.
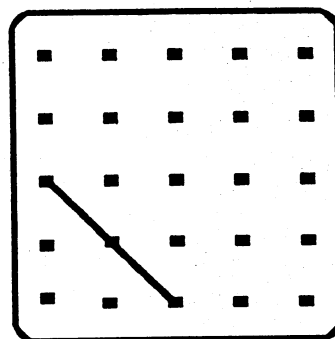
★★ 3. These are the favorite pets in a first grade class. How
         many more children liked dogs, than birds and fish
         together?

                              Answer: _____ more
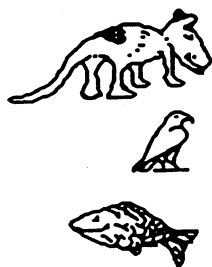
Small Pets
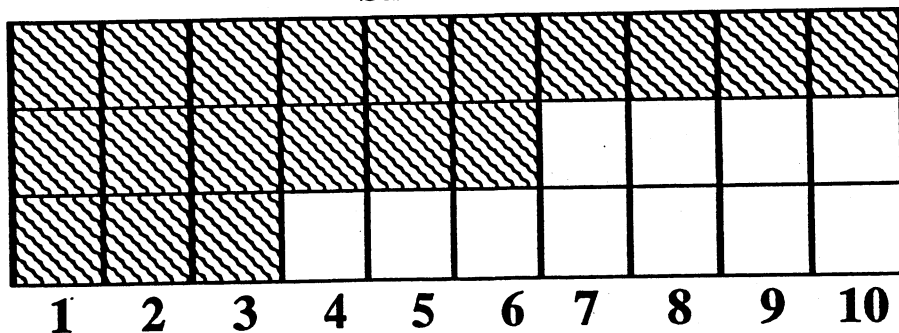
★   4. Four children each chose a shape. Jessica's shape is oval. Jane's shape has 4 corners and 4 sides the same length. Scott's shape has 3 sides. Which shape did Mark choose? Circle the answer.
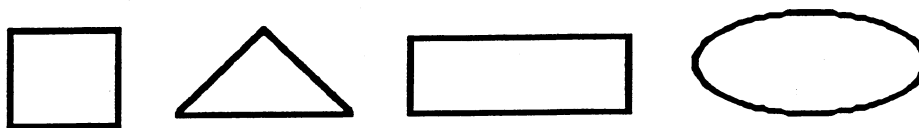
★★★   5. Write the missing numbers in this part of the hundreds chart.

	4	
13	14	
23		

★★★★6. Use these digits: 1   9   3   6

What is the least 2-digit number you can make? _____

What is the greatest 2-digit number? _____

★★★ 7. Complete the table.

Number of pencils	1	2	3	4	5	6	7
Amount you pay	3¢						

How much would 10 pencils cost?_____

3¢
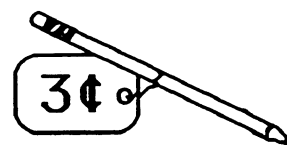
SUNSHINE MATH - 1
Venus, IV

(This shows my own thinking.)

★★ 1. Superstar, what number
is missing on the star so
that the sum is 19?
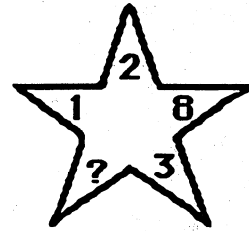
Answer: _____

★★ 2. Look at the cats!

How many tails on all those cats? ____

How many ears on all those cats?____

How many legs on all those cats?____
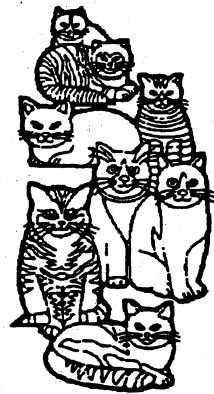
★★★ 3. Teaka finishes dinner at 6
o'clock. She reads her book
for 2 hours. Then she goes to
bed. Draw the hour and
minute hands on the clock to
show when Teaka goes to bed.
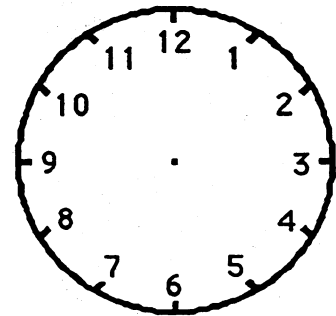
★★ 4. The bug below breaks in half every day. Each half
becomes a new bug. If 5 bugs break apart, how
many bugs will there be the next day? _____

★★★ 5. There are 3 children and 1 wagon. Two children can play at a time. One child can ride and one child can pull. In the table, show all the ways the children can ride and pull.
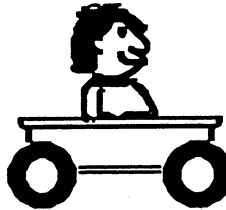
Sam   Kevin   Alice

Child Pulling	Child Riding

★★ 6. Herick ran the ball for 5 yards.Then he ran for 3 more yards. Then he lost 2 yards on a run. His jersey number is 13. How far did he run on those three plays?

Answer: _____ yards

★ 7. About how many triangles does it take to cover the big shape? Circle the best estimate.
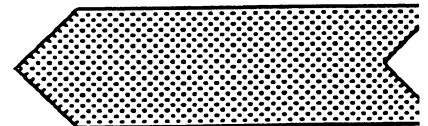
5 triangles?   10 triangles?   20 triangles?

Name:_____

(This shows my own thinking.)

★★★★ 1. Count the number of dots on each card. Find a pattern.
Use the pattern to fill in the empty cards with dots.
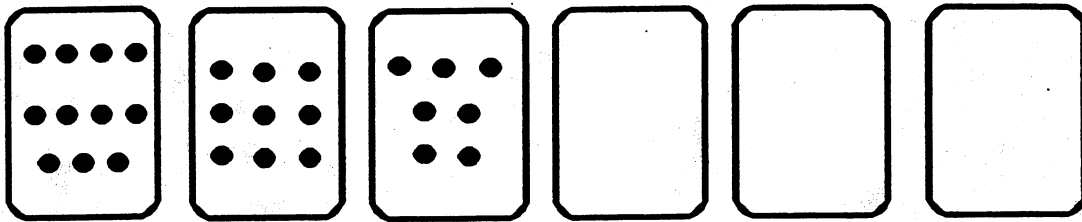
★★ 2. On each thermometer,
darken in the center to show
the temperature given.

°C   °C

100   100

50   50

0   0

40° C   65° C
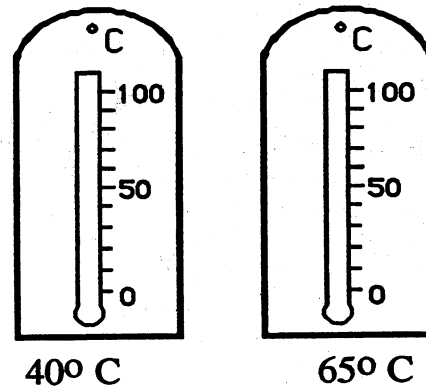
★ 3. Use + or - in each box to make the sentence true.

3 ☐ 4 ☐ 2 ☐ 6 = 11

★ 4. Three children divided up the 6
cookies fairly. How many did
each child get?

Answer: Each got _____ cookies
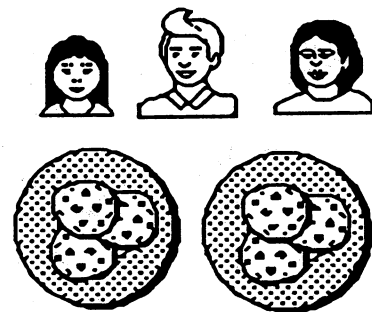
★★★ 5. If you took the crayons in the box and broke them in half, how many children could have something to color with?

Answer: _____ children
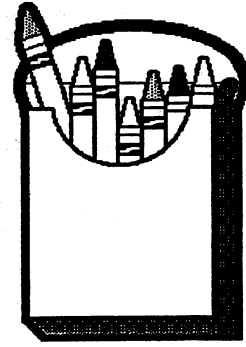
★★★ 6. Tamika can buy 3 buttons for a dime. She needs 12 buttons for a project. How much will they cost?

Answer: _____¢
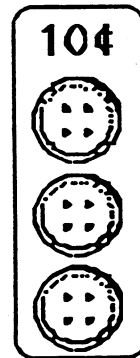
★★★★ 7. How many gray squares are needed to continue the pattern?
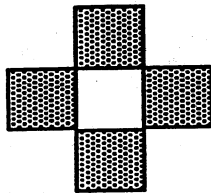
1 white square   2 white squares   3 white squares   4 white square
4 gray squares   6 gray squares   8 gray squares   ? gray squares
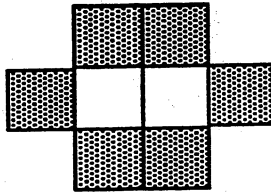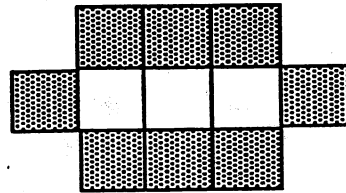
Answer: _____ gray squares

★★★ 8. (a) Name a body part that you have 2 of: _____

(b) Name a body part that you have 10 of: _____

(c) Name a body part that you have more than 100 of:

_____

25

Name:_____

(This shows my own thinking.)

★★★ 1. Color the numbers the same color as the baskets where
they belong! What numbers are left without a color?

Red less than 11	Green greater than 15 and less than 28	Blue greater than 36

17 10 39 5 3 31

42 26 20 48 34

29 19 2

Answer: _____ do not belong in any basket.

★★ 2. Quan has a dime.
He finds a nickel.
He buys a pear for 13¢.
How much money does he have left?

Answer: He has ____ left.
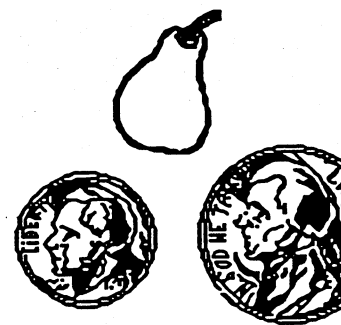
★★ 3. Find the number that goes in the box in part (a). Put it in
the box for part (b). Write the answer to part (b) on the
line.

a. 4 + ☐ = 7   b. ☐ + 8 = ____

★★★ 4. You are having a party. You will need 70 balloons. Circle the boxes you could buy to make 70.

20 balloons   **40 balloons**   **50 balloons**
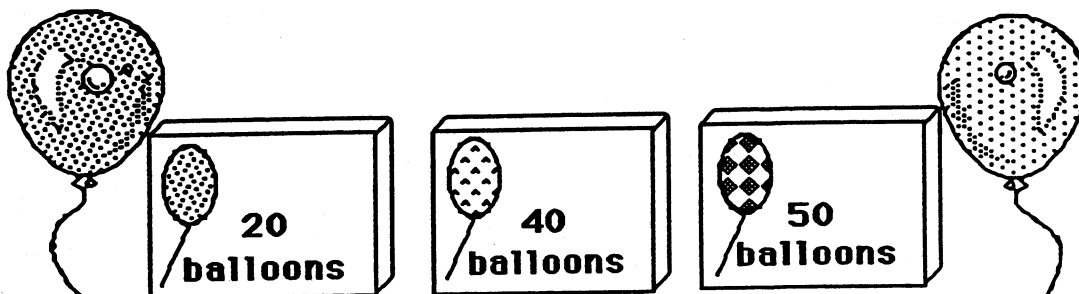
★ 5. You have 3 blocks. One is yellow, one is brown and one is green. Which block is green?

• The yellow block is in the middle.

• The brown block is on top.
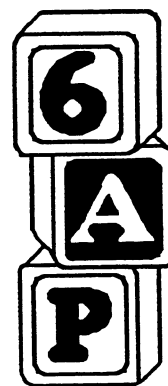
Answer: The green block is

_____.

★★ 6. How many triangles are there in all?
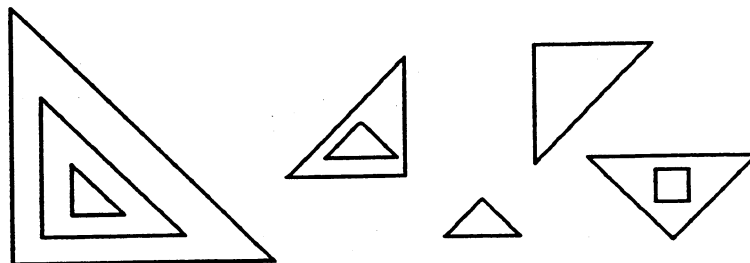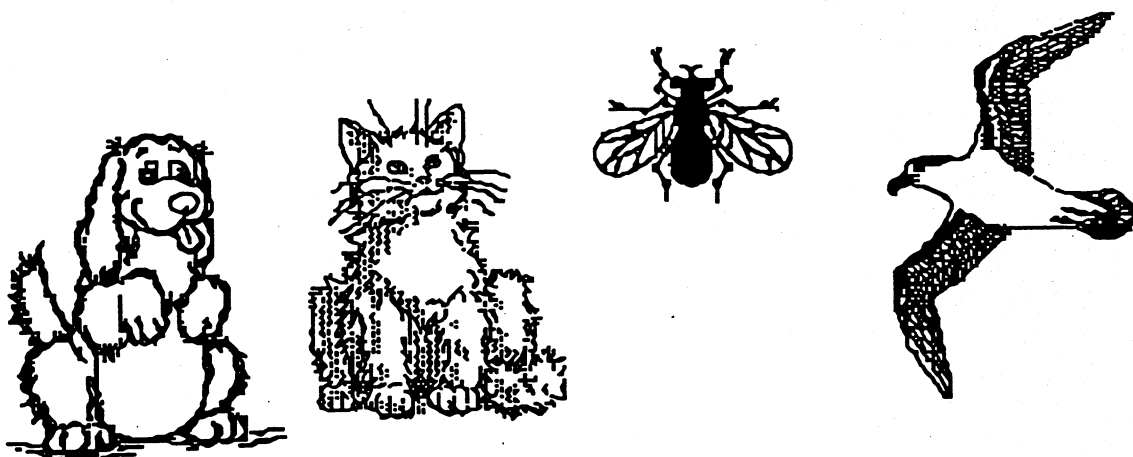
Answer:_____triangles

SUNSHINE MATH - 1
Venus, VII

Name:_____

(This shows my own thinking.)

★★★★ 1. The dog ate 9 flies. The cat ate 3 more flies than the dog. The bird ate 2 more flies than the cat.

How many flies did the bird eat? _____

How many flies did all three animals eat? _____

★★ 2. How many legs are on 5 lambs?

Answer: ____ legs

★★★ 3. How many trucks can you buy for 30¢?

Answer: ____ trucks

13¢
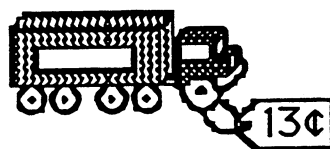
★   4.   Which letters are in the triangle?
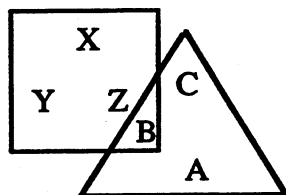
Answer:_____

★★★ 5.   I have 4 tens. My ones digit is 2 more than my tens digit. What number am I?

Answer: _____

★★   6.   Put a + or − in each circle to make a true sentence.

13 $\bigcirc$ 4 $\bigcirc$ 8 = 17

★★   7.   Tom has half as many pennies as Sue. Sue has 20 pennies. How many pennies does Tom have?

Answer: _____ pennies

SUNSHINE MATH - 1
Venus, VIII
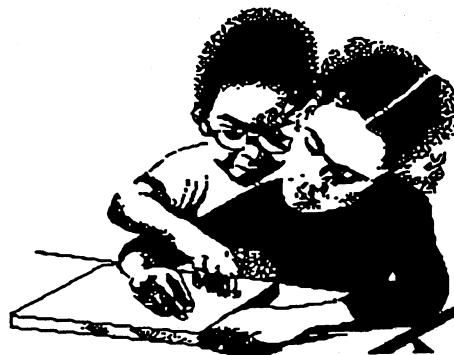
★★ 1. Draw the next figure in the pattern.

★★★★ 2. At one o'clock the team played soccer. One and a half hours later, the team left the field. Place the hour and minute hand on the clock to show when the team left the field. Or if you prefer, write the time they left on the digital clock.
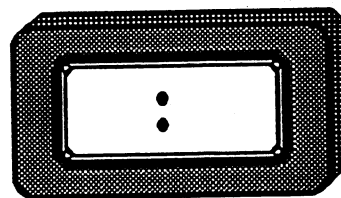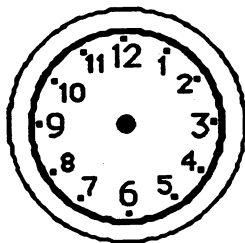
★★ 3. My sister earns 10¢ for making her bed. She wants to earn 50¢. How many times must she make her bed?

Answer: _____ times

★★★ 4. If you write the numbers from 1 to 40, how many times would you write a 7?

Answer: _____ times

★★★ 5. Put the *greater than* (>), *less than* (<), or *equal to* (=) in the box to compare each problem.

a. (10¢) (10¢) (10¢) ☐ (5¢) (5¢) (5¢)

b. (25¢) ☐ (10¢) (10¢) (5¢)

c. (10¢) (5¢) (5¢) (1¢) (1¢) ☐ $0.32

★ 6. How many days in December are after December 16?

Answer: _____ days

December						
Sun.	Mon.	Tues.	Wed	Thur	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			

★★★ 7. Use the rule. Complete the table.

Rule: Out is 10 more than In

In	Out
5	15
7	☐
10	☐
21	☐

31
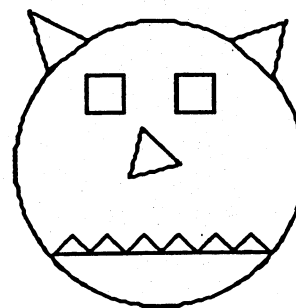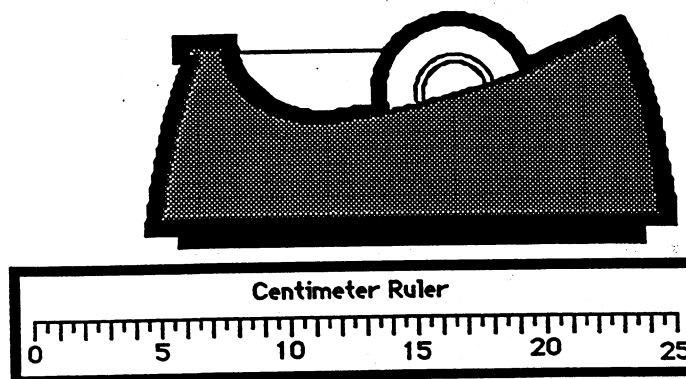
Name:_____

(This shows my own thinking.)

★★★★ 1. Wooden faces are made in a
factory. The cost of making each
shape is shown below. How
much does it cost to make this face?

Any triangle costs 3¢
Any square costs 5¢
Any circle costs 6¢

Answer: _____ ¢

★★ 2. Lourdes said the tape
dispenser was 25
centimeters long. But
he did not start
measuring at zero.
How long is it?

Answer:
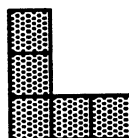
___ centimeters

Centimeter Ruler

★★ 3. Follow the pattern. How many squares do you need to
make E? _____ How many to make F? _____
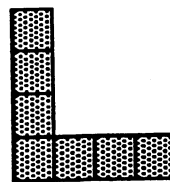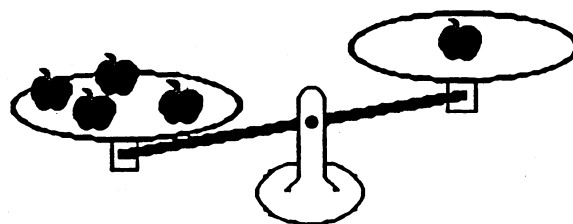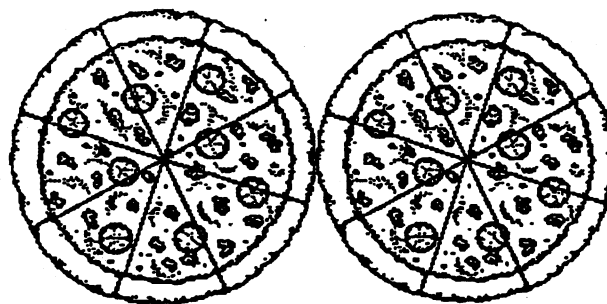
A   B   C   D   E   F

★   4. I am thinking of a number. When you subtract 6 from the number, you get 13. What is my number?

Answer: _____

★   5. Draw in enough apples to balance the scale.

★★★ 6. Four kids divided the 2 pizzas in a fair way. How many pieces did each get?

Answer: _____

★★   7. Write all the 2-digit numbers you can make with these cards:
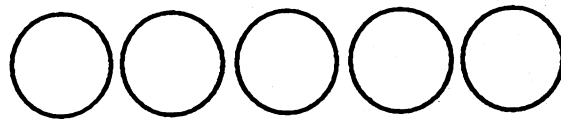
| 4 | | 8 | | 6 | | 5 |

Write them in this box:

SUNSHINE MATH - 1
Venus, X

★ 1. Jill and five friends are having a party. Each person wants 2 cupcakes. How many cupcakes will they need?

Answer: _____ cupcakes

★★★ 2. Below are 5 coins with the faces covered up. The coins are worth 42¢ in all. What coins are they? Write the value in cents on each coin.

◯ ◯ ◯ ◯ ◯

★★ 3. March has 31 days. If March 1 is a Thursday, what day of the week is the last day of the month?

Answer: _____

MARCH						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

★ 4. The Kindergarten had 24 children, then four more joined the class. The first grade had 23 children, then six more joined the class. Which class has more children now?
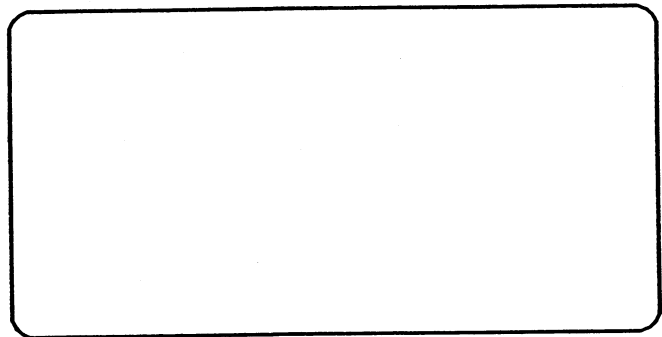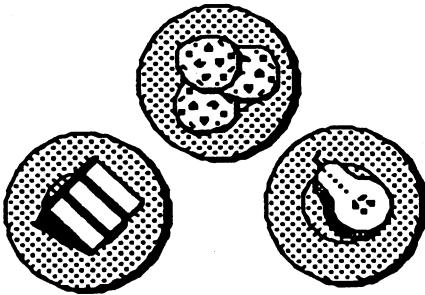
Answer:_____

★★ 5. How many squares are in the
picture of the house?

Answer: _____

★★★ 6. You are planning a party. You want to fit as many
plates of dessert on the table as you can. About how
many of the plates would fit?
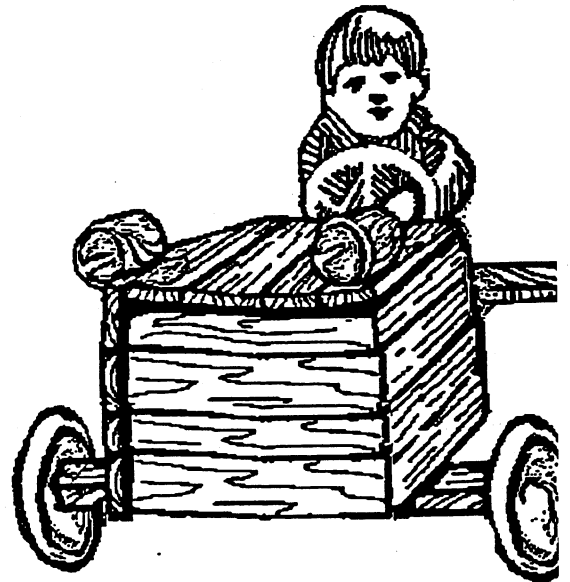
Answer: _____ plates

★★ 7. If you and two friends
wanted to each build a car
like this, how many car
wheels would you need?

Answer: _____

How many tin cans would
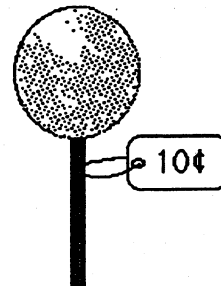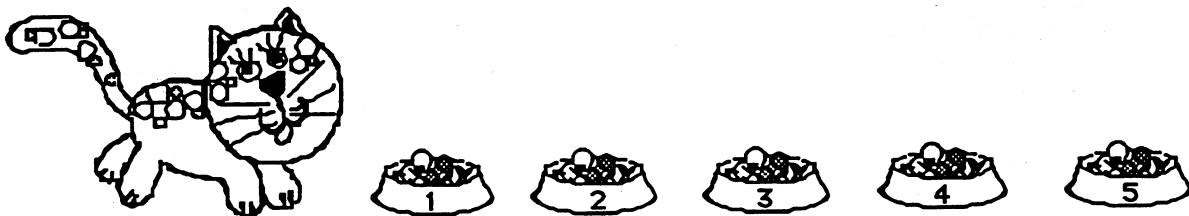you need for lights?

Answer: _____

Name:_____

★★ 1. How much change should you
get if you paid with a quarter?

Answer: _____

10¢

★★★ 2. It takes 6 kitten steps to walk to the first bowl. It
takes 4 steps to walk from one bowl to the next bowl.
How many steps does it take for kitty to walk from
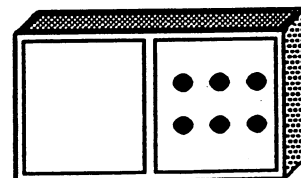where he is to bowl 5?

1 2 3 4 5

Answer: _____ kitten steps

★ 3. Jessica is in line. Three girls are in front of
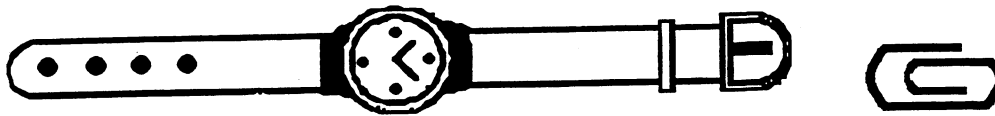her. 5 girls are in back of her. How many
girls are in the line?

_____ girls

★ 4. Make the domino a double. Write
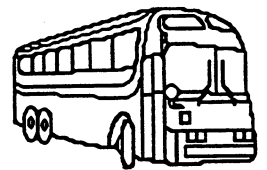an addition sentence for the double
domino.

Answer: _____ + _____ = _____

36

★★ 5. About how many paper clips would it take to measure the length of the watch?

Answer: _____ paper clips

★ 6. Use mental math.
24 children are on the bus.
3 more got on.
2 got off.
1 more got on.
How many children are on the bus now?

Answer: _____ children

★★ 7. Do each step in the flowchart. Write your answer in the empty box.

$4 $\xrightarrow{+}$ $3 $\xrightarrow{-}$ $2 $\xrightarrow{+}$ $1 $\xrightarrow{=}$ ☐
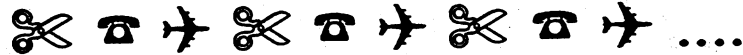
★★★ 8. Find the number that goes in the first step of the flowchart. Write it in the empty box.

☐ $\xrightarrow{+}$ $1 $\xrightarrow{-}$ $5 $\xrightarrow{+}$ $2 $\xrightarrow{=}$ $4

SUNSHINE MATH - 1
Venus, XII

Name:_____

(This shows my own thinking.)

★★★★ 1. Look at the pattern.

✂ ☎ ✈ ✂ ☎ ✈ ✂ ☎ ✈ ....

Draw or name the 10th figure in the pattern: _____
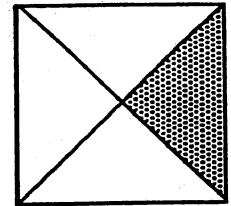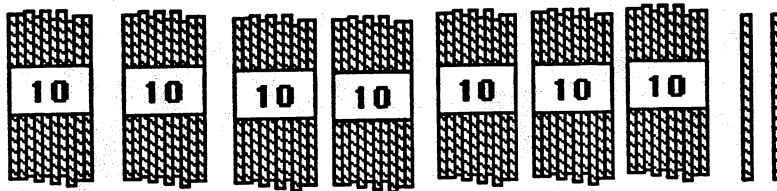
Draw or name the 14th figure in the pattern: _____

★★ 2. Circle the name of the shaded part of the
square.

    A. one-third   C. three-fourths

    B. one-fourth   D. four-fourths

★ 3. How many straws are shown below? _____

| 10 | 10 | 10 | 10 | 10 | 10 | 10 | | |

★★ 4. How many different triangles
are there in the figure to the
right?

Answer: ____ triangles

38
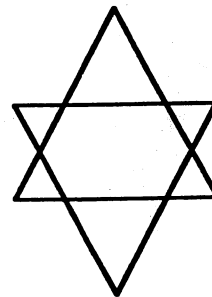
★★★ 5. Place the numbers 1, 2, 3, 4, 5, and 6 in the circles so that the sum along each side is 10.
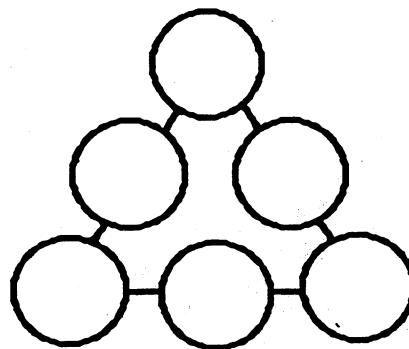
★★★ 6. Help the girl get from her spot at the zoo to each of the animals. Tell her how many blocks EAST to go and then how many blocks NORTH.

- To get to [elephant] go 1 East and 3 North.

- To get to [alligator] go

  ____ East and ____ North.

- To get to [cat] go

  ____ East and ____ North.

- To get to [moose] go

  ____ East and ____ North.
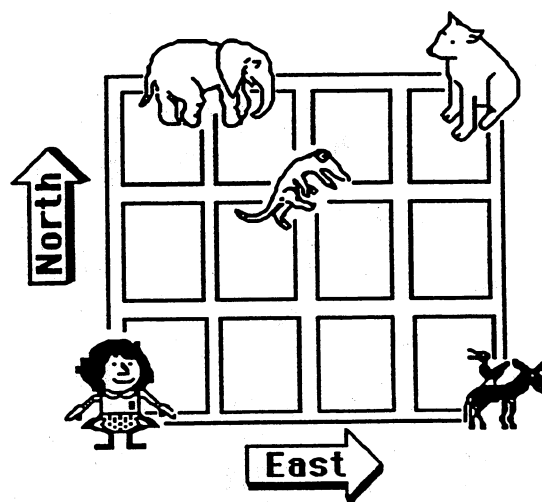
★★★★ 7. Alberto gets up at 6:30 a.m. Three hours later he goes to the library. One and a half hours after that he eats lunch. Show the time he eats lunch on both clocks.
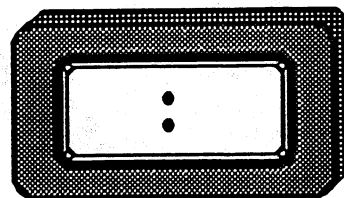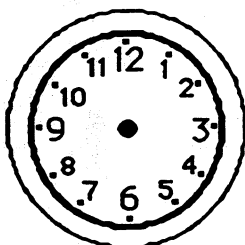
*Name:*_____

(This shows my own thinking.)

★★★ 1. Use the chart. Find the value of each word.

A→1¢	B→2¢	C→3¢	D→4¢	E→5¢	F→6¢
G→7¢	H→8¢	I→9¢	J→10¢	K→11¢	L→12¢
M→13¢	N→14¢	O→15¢	P→16¢	Q→17¢	R→18¢
S→19¢	T→20¢	U→21¢	V→22¢	W→23¢	X→24¢
Y→25¢	Z→26¢				

BALL = 2¢ + 1¢ + 12¢ + 12¢ = 27¢

ROPE =___ QUILT = ___ Your first name = _____

★★★ 2.
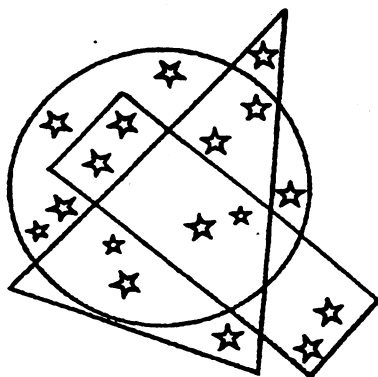
A. How many stars are there in the triangle? _____ stars

B. How many stars are in the circle? _____ stars

C. How many stars are in the rectangle? _____ stars

★ 3. Circle the animal that weighs more.

40
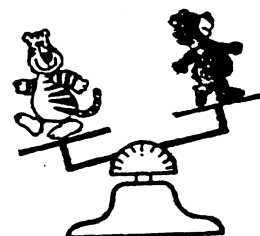
★★ 4. Two pictures below can be folded so that the two halves match. The other picture can't be folded to match. Color the two that can be folded to match.
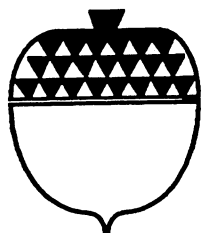
★★ 5. Jan has a toy train. She placed George's house 2 meters from Susan's house. Estimate how far it is from George's house to Barry's house. Circle the answer.
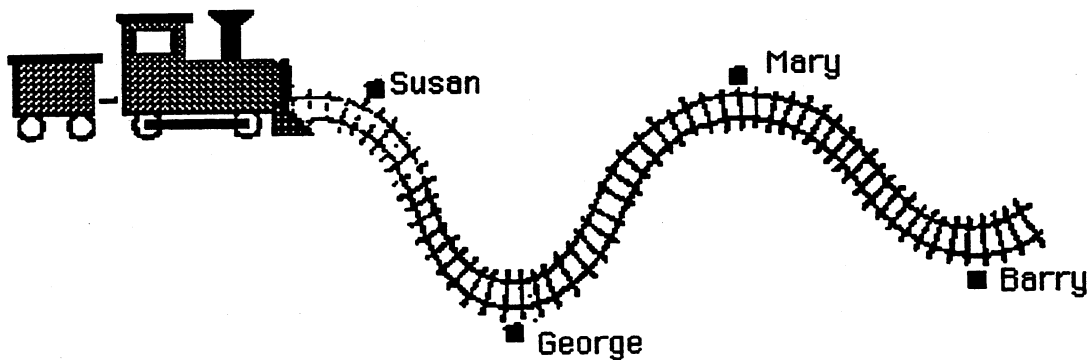
A. 8 meters   B. 6 meters   C. 4 meters

★★★★ 6. Ramon stops by his Gramma's house each day on his way to school. He has 2 ways to walk to his Gramma's house. He has 3 ways to walk from there to school. How many ways can he travel from his house to school?

_____ways
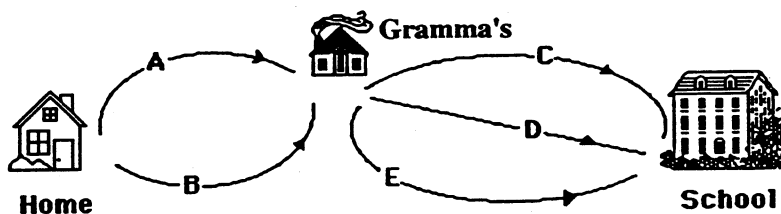
★★★★ 1. If it costs 10¢ to make
1 cut, how much
does it cost to cut a
log into 5 pieces?

Answer: _____¢

10¢
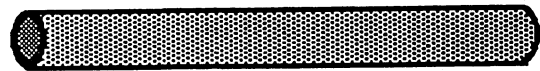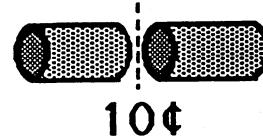
★ 2. Look at the puzzle below, then circle the piece that will
fit in the shaded area.
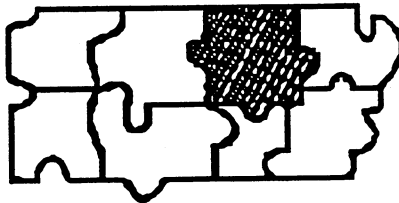
A   B   C

★★ 3. Circle the type of button that Keisha bought.
•The button costs more than a nickel, and
•The button costs less than a dime.

7¢   15¢   3¢
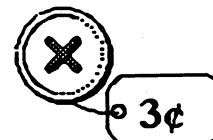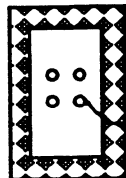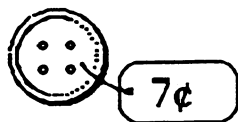
★ 4. Bozo chewed a hole in Lu's homework. He chewed the numbers in the ones place, and the whole answer.
Circle the best *estimate* of the answer to the problem you can see.

- about 110

- about 60

- about 30

★★ 5. It takes 50 stars to make an American flag. If you laid 50 stars out in rows with 10 stars in each row, how many rows would you have?

Answer: _____ rows
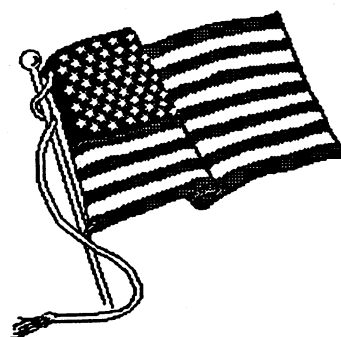
★★ 6. A cat is asleep on a mat at a pet store. About how many curled-up cats can sleep on this mat, at one time?

Answer: about _____ cats
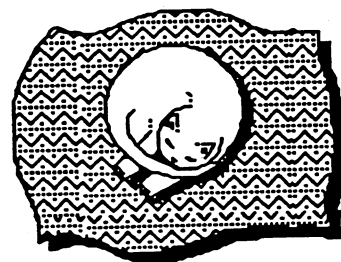
★★ 7. A kangaroo's tail is about as long as the kangaroo is tall. Draw the right size tail on this kangaroo.

43

Name:_____

(This shows my own thinking.)

★★ 1. Draw a rectangle. Make it 3 centimeters wide and 7 centimeters long. Start at the corner below.

★★ 2. An ant walked around the outside of your rectangle above. How many centimeters did it walk?

Answer: The ant walked _____ centimeters.

★★★ 3. Kareem won a prize for making a number machine. He puts a number into the machine. Another number comes out. The number that comes out depends on how the dial is set. Fill in the table. Show the numbers that come out, or go in. The setting is *subtract 7*:

IN

OUT
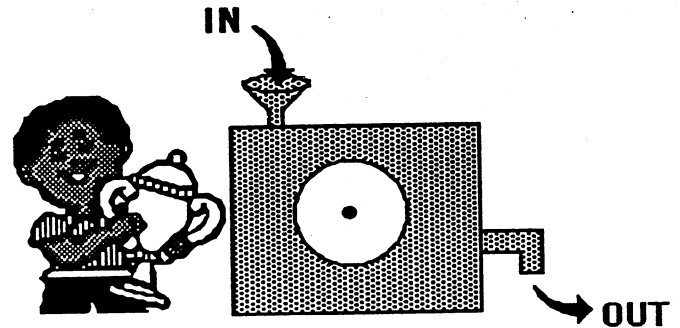
In	Out
11	4
15	
19	20

★ 4. Richard has 3 dimes, a nickel, and 3 pennies. He buys a pencil for 26¢. Does he have enough left to buy an eraser for 10¢?

Answer: _____ (yes or no)

★★★ 5. How many more cups of milk than soda are there?

| Soda | 🥤🥤🥤 |
| Milk | 🥤🥤🥤🥤🥤 |

🥤 stands for 2 cups.

Answer: _____ more cups of milk

★ 6. Sally has 4 red trucks. She also has 2 yellow trucks, 2 blue trucks, and 1 purple truck. How many trucks does Sally have in all?
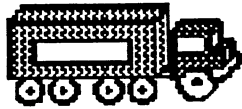
Answer: _____ trucks

★★ 7. What time is soccer practice? Circle the right clock.

It is after 4 o'clock.
It is before 6 o'clock
It is not 5 o'clock.

| 4:00 | 5:30 |
| 5:00 | 6:00 |
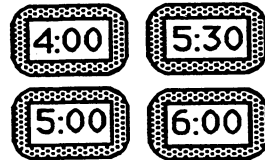
★★★ 8. There are 4 classrooms. 26 children are in each classroom. How many children in all 4 classrooms?

Answer: _____ children

★★ 9. How much does the piece of cake weigh by itself?

Answer: ____ ounces

5 ounces   16 ounce

45
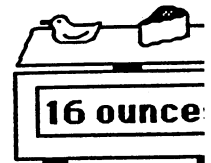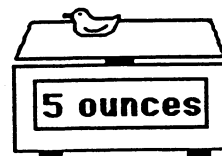
SUNSHINE MATH - 1
Venus, XVI

(This shows my own thinking.)

★★★ 1. Put 2, 3, 4, 6, 7 and 8 in the circles so that the sum along <u>each</u> line is 19. Use each number just once.
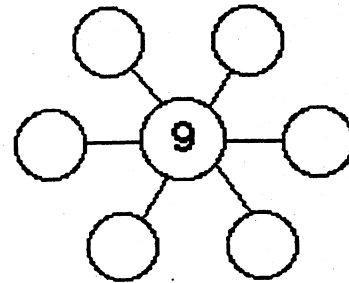
★★★ 2. Use the calendar to answer the questions.

January

Sun	Mon	Tue	Wed	Thu	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			

What date is the second Wednesday of the month?
Answer: _____

How many Saturdays are in January?
Answer: _____

What date is two days before the fourth Thursday?
Answer: _____

★ 3. What numeral do the number blocks show?

Answer: ____

★★ 4. On a number line,

0 5 10 15 20 25 30
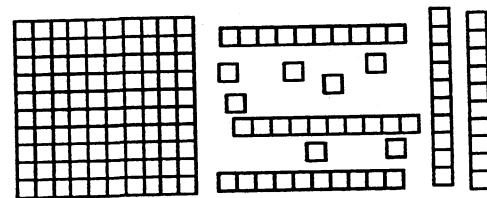
a. is 13 closer to 10 or 20?   Answer: _____

b. is 28 closer to 20 or 30?   Answer: _____

46

★★★★ 5. Use the picture graph about a class to answer the questions.

Our Favorite Subject	
art	🙂🙂🙂🙂
music	🙂🙂🙂🙂
reading	🙂🙂🙂
math	🙂🙂🙂
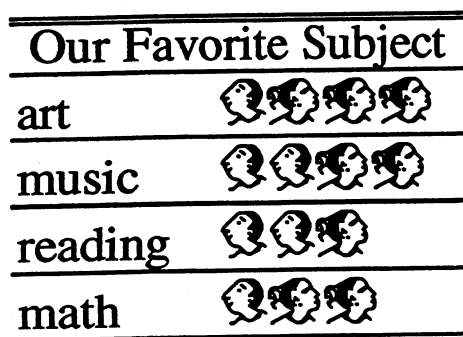
key: 🙂 = 2 boys
🙂 = 2 girls

How many people like art best?
Answer: _____

How many more people like music than reading?
Answer: _____

How many boys and how many girls are in the class?

Answer: ____ boys and ____ girls

★ 6. How long is the pencil? Each box is 1 centimeter long.
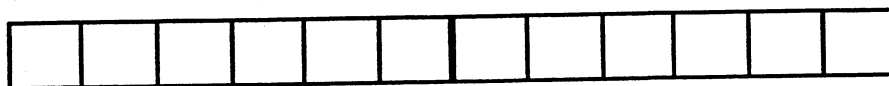
Answer: _____ centimeters

★ 7. Draw a pencil that is 3 centimeters shorter than the one above:

Draw it here:

★★★ 1. Find a pattern. How many pennies do you need to add three more rows?

Answer: _____ pennies

★ 2. Tamika subtracted $5.00 from $12.00 on her calculator. She got the answer shown. Circle the sentence below that makes the best sense.

a. Her calculator may be broken.
b. Her calculator needs a battery.
c. Her calculator is working fine.
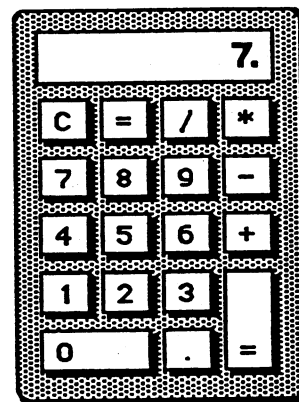
★★ 3. Measure the length of the key. Use an inch ruler.
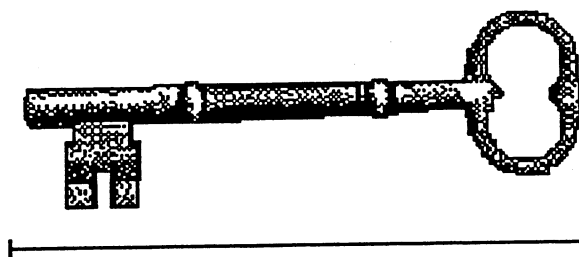
Answer: _____ inches

★ 4. $10 - 9 + 8 - 7 + 6 - 5 + 4 - 3 + 2 - 1 + 0 =$____

★★★ 5. Next year your older sister will be 12, your brother will be 14 and you will be 7 years old. You have a box of 35 birthday candles. Are there enough candles for the birthday cakes?

Answer: _____ (yes or no)

★ 6. Pretend that yesterday was May 5th. Then tomorrow would be May _____.

★★★ 7. Rachel got a baby chick for Easter. She made a graph of the chick's weight, in grams, each month.

a. How much did the chick gain from April to May? ____ gram

b. How much did the chick gain from May to June? ____ gram

c. Finish the graph. Show the chick gained 5 grams each mon through October.
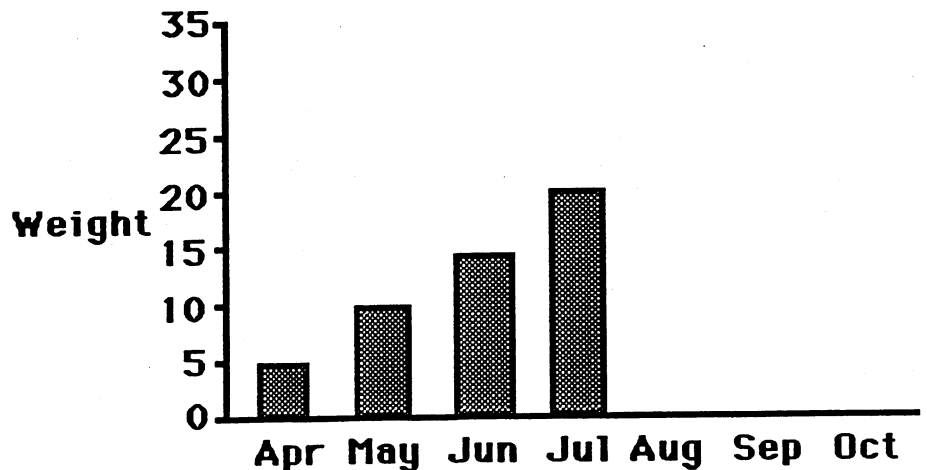
SUNSHINE MATH - 1
Venus, XVIII

★★   1. You have a dime and four
         pennies. How much more do
         you need to buy the apple?
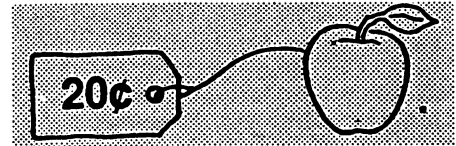
         Answer: _____ ¢

★★★ 2. Rachael goes to the zoo at 10:15. She stays until 1:00.
         Which animals can she see being fed?

Feeding Times

Animal	Time
monkeys	10:00 to 10:10
lions	10:30 to 10:45
elephants	11:00 to 11:30
bears	12:00 to 12:30
zebras	1:30 to 1:45
giraffes	2:30 to 2:45

Answer:_____

★★★★ 3. I saw some lions at the zoo.
         I counted 24 lion legs. How
         many lion tails did I see?
         How many lion eyes did I see?
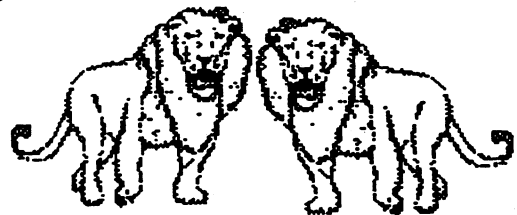
         Answer: ____ tails and ____ eyes

50

★★ 4. Paul made three figures like this from blocks. How many blocks did he use altogether?
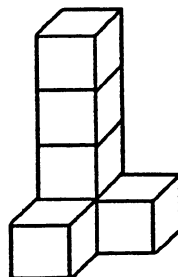
Answer: _____ blocks

★★★ 5. Twins Ken and Len had the same size sandwich. Ken cut his sandwich in half and ate one part. Len cut his sandwich in half and ate one part. Who ate the biggest half?

Ken's half

Len's half
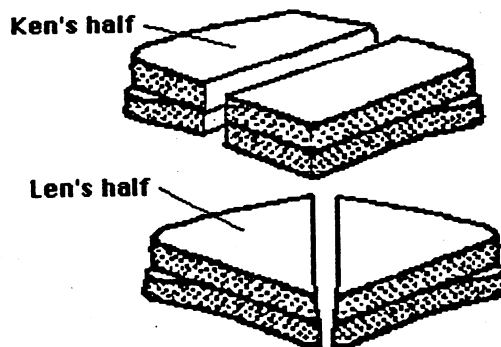
Answer: _____

★★★ 6. In *arrow math* , follow the arrow. For example, 38→39 and 23↗14. Write the new number in each box.

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	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

7 ↓ ☐   4 ↓ ☐   25 ↓ → ☐

★★ 7. Use *arrow math* to find this number:

24 ↗ → ↗ ☐

51

★   1. How many dimes and how many pennies do you need to
        buy the ice cream sundae?

        sundae ....41¢
        soda ...... 36¢
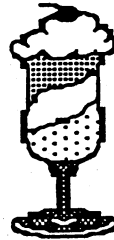
        Answer: _____ 's and _____ 's

★★ 2. Amy bought 20 more rocks than shells. Which two
        bags did she buy? Circle the bags.

        60 rocks   80 rocks   50 shells   60 shells
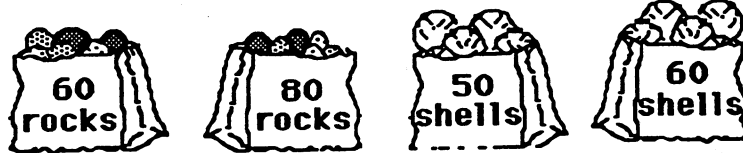
★★ 3. Jan tossed three beanbags.
        Each beanbag landed on a different number.
        Jan's score was 8.
        What numbers did the beanbags land on?
        Circle them.

1	3
2	4

★★★★ 4. A frog fell in a 10-foot deep hole. The frog jumps up 3 feet, but falls back 1 foot while resting for the next jump. How many jumps does it take the frog to get out of the hole? Draw a picture of the frog's trip, to help you.

Answer: The frog got out in _____ jumps.
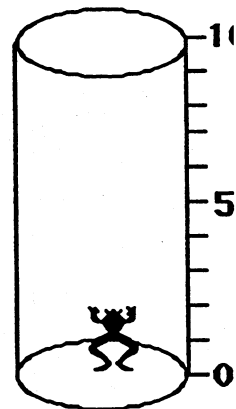
★★★ 5. Write the numbers and the number sentences. The first is done for you.
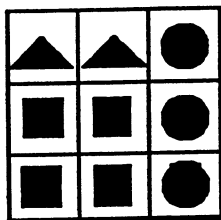
Shapes in All:	Remove:	Number Left:	Number Sentence:
9	all ▲'s	7	9 – 2 = 7
___	all ●'s	___	_____
___	all ■'s	___	_____
___	all ■'s and all ●'s	___	_____

★ 6. Draw 5 X's in each box.
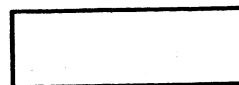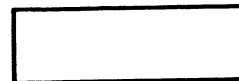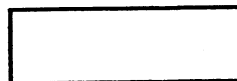
Draw 4 extra X's not in any box.
How many X's in all?

Answer: _____ X's

53

*Name:*_____

(This shows my own thinking.)

★★★ 1. Jake bought a pencil and a ruler. He spent a quarter and two pennies. How much did the ruler cost? Write the cost on the sales tag.

10¢
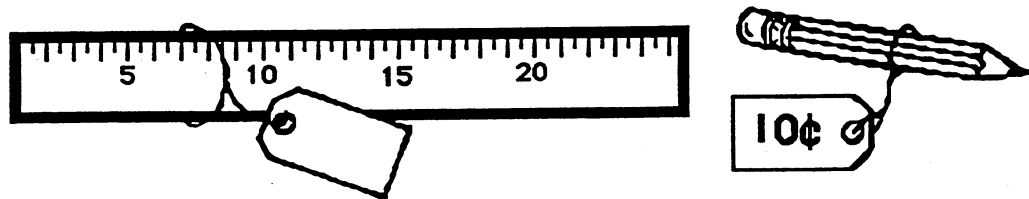
★★★ 2. Three apples were the same size. Jorge made the 3 apples balance with twelve 1-ounce weights. How much did each apple weigh?
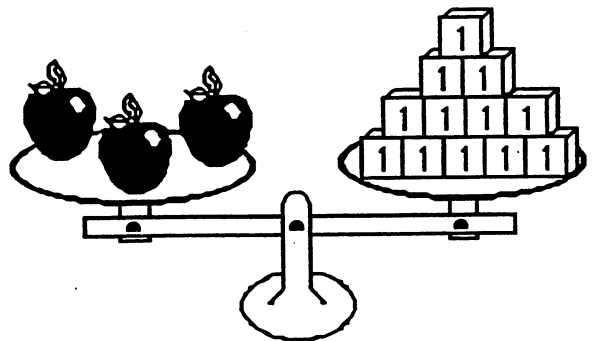
Answer: _____ ounces

★ 3. Use an inch ruler to measure the pencil.

Answer: _____ inches

54
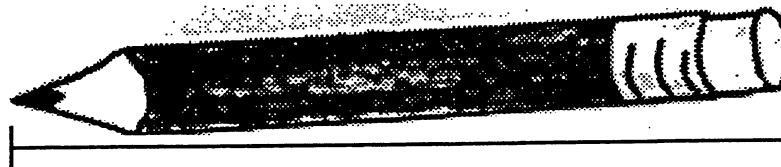
★★   4. Pete and his 3 friends are lined up. Use these clues to find Pete's place in line.

   • Pete is next to his friend that speaks no evil.
   • Pete is not on the end.

   Write your answer here: Pete is ____ in line.
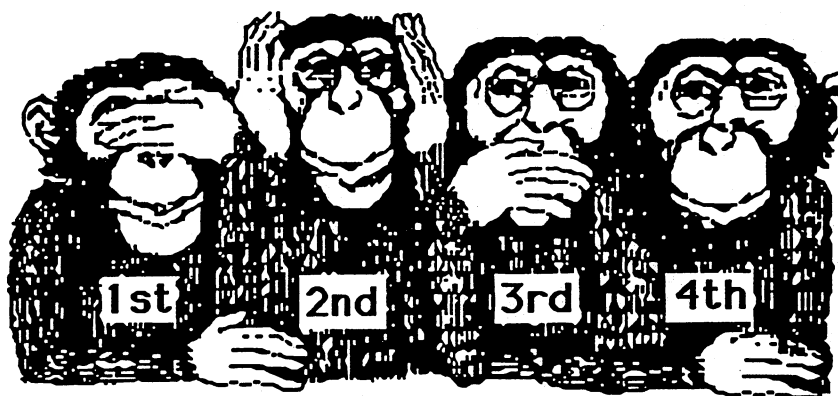
★   5. If you write the numbers 1 through 30, how many times will you write a 3?

   Answer: _____ times

★★   6. Use these shapes. Create a picture worth 18¢. Your shapes can be larger or smaller than the ones shown. Draw your picture below:
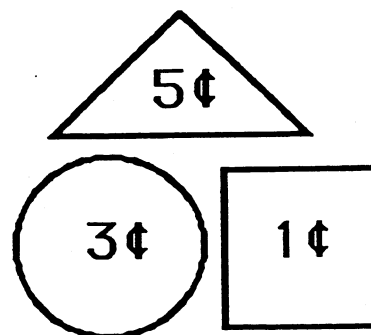
Name:_____
(This shows my own thinking.)

★★ 1. A jump is three spaces. The frog starts at zero. He jumps forward 2 times, then jumps backwards 1 time. The frog jumps forward 2 more times. What number does he end on? Circle it on the number line.
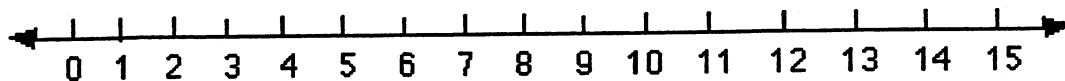
★ 2. If the frog above started at 1 instead of 0, and made the same jumps, where would he end up?

Answer: _____

★★★ 3. How many blocks will you need to build this tower?

Answer: _____ blocks
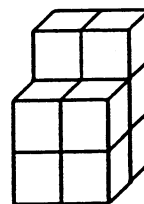
★ 4. Use a calculator. Press: ⟨2⟩ ⟨5⟩ ⟨+⟩ ⟨5⟩ ⟨=⟩ ⟨=⟩ ⟨=⟩ ⟨=⟩ .....

Stop when you reach 75.
How many times will you press ⟨=⟩ ?

Answer: _____ times

★★ 5. I have 4 coins. One is a quarter. I have 41¢ in all.
What coins do I have? Draw your answer in the box.

Answer: [   ]

★★ 6. The 3 boxes across have the
same sum as the three boxes
down. Write in the missing
numbers.

```
        ┌────┐
        │ 10 │
   ┌────┼────┼────┐
   │ 6  │    │    │ → 18
   └────┼────┼────┘
        │ 2  │
        └────┘
          ↓
          18
```
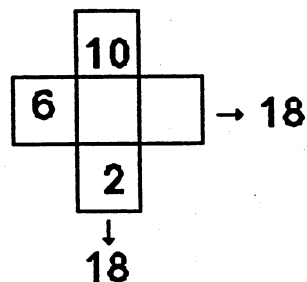
★★★ 7. Linda had 8 apples. Half of them were green.
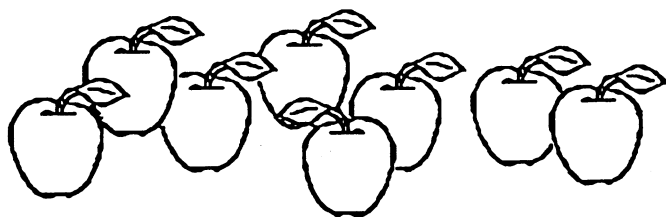
How many green apples did she have left after she
ate one of them?

Answer: _____ apples

57

Name:_____

(This shows my own thinking.)

★★ 1. Karen, Joe and Keesha are playing a game.

> Karen has 15 points.
> Keesha has 10 more points than Karen.
> Joe has 5 points less than Keesha.

How many points do Joe and Keesha have?

Answer: Joe has _____ points.

Keesha has _____ points.

★★★★ 2. How much does an apple cost?

🍎 + 🍊 = 50¢

🍊 + 🍊 + 🍊 = 60¢

Answer: _____ ¢

★★★ 3. An angle is a corner where
two straight lines meet.
How many angles are there
in the sale tag to the right?

Answer: _____ angles
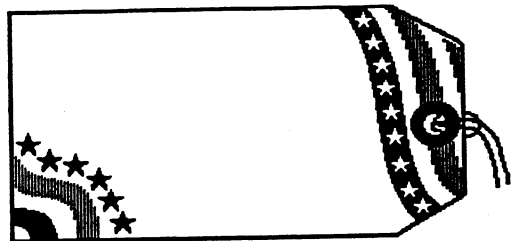
★★★★ 4. Jane, Bill, Tom and Sue went to the school carnival.
Jane won 4 prizes. Bill won 2 prizes. Tom did not win
a prize. Sue won 6 prizes. Use the key to make the
right number of happy faces for each child.

Jane	
Bill	
Tom	
Sue	

Key: 2 prizes = ☺

★★ 5. Roll a die 20 times.
Make a tally mark each time below the face that lands
'up'. Circle the face that comes up most often.

★★★ 6. Practice adding in your head on the problems below. Find
numbers that add to ten. This will make your work easy.

```
  6    7    9    2    5    8    1    3
  2    1    8    5    6    9    3    4
  8    3    1    5    1    2    7    6
  4    9    5    2    4    1    6    8
 +1   +2   +3   +3   +7   +4   +2   +7
```

When you turn in your paper, you will have a problem like
this to do in your head. Put your answer here: ☐

*Name:*_____

(This shows my own thinking.)

★★★★ 1. Help the robot. Tell him how many steps *over*, and how many steps *up*, to find an object. The robot always starts at **X**.

The first one is done for you in the chart.
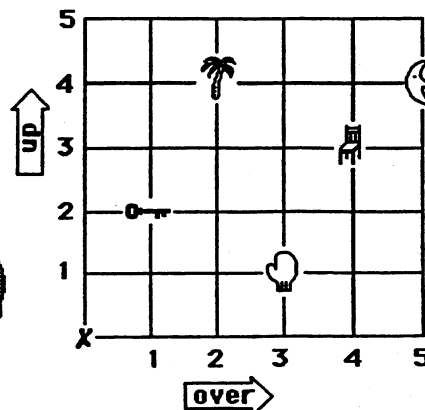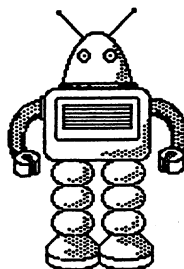
To find the:	Go over:	Go up:
tree	2	4
mitten		
chair		
key		
moon		

★★ 2. Margo's cat had 4 kittens. Her hamster had 5 baby hamsters. She gave away 3 kittens and 2 hamsters. How many animals did she have left to play with?

Answer: _____

★★★ 3. Put either ¢ or $ beside each number below. The sentence should make sense, after you are through.

a. A new shirt might cost   10 .
b. A piece of bubble gum might cost   5 .
c. A new pencil might cost   25 .

60

★★★ 4. Match each picture with the best rule. Write the letter of
the rule on the given line. Use each rule only once.

Rules A. They can all roll straight.
         B. They can all be stacked on top of each other.
         C. They all have a curved side.
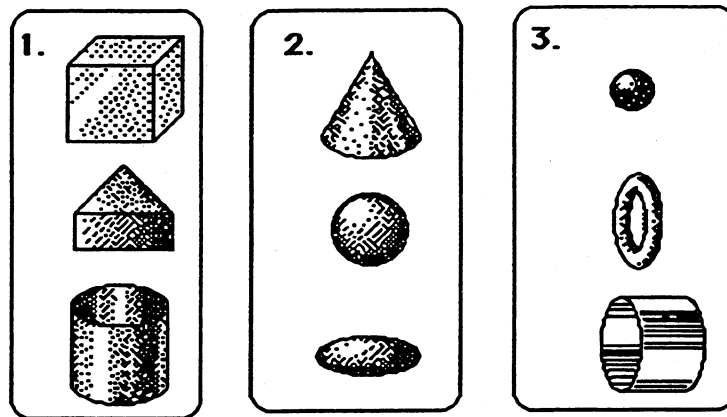
Rule: _____   Rule: _____   Rule: _____

★★★★ 5. Use the number chart
to fill in the missing
numbers.

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	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

a.   25

b.   25

c.   39

d.   15
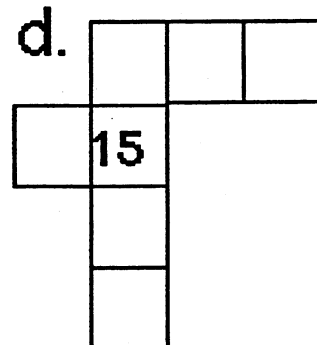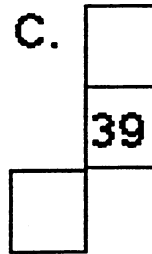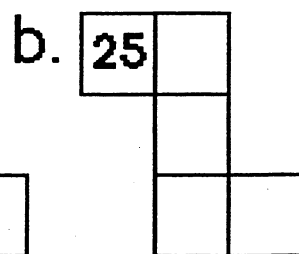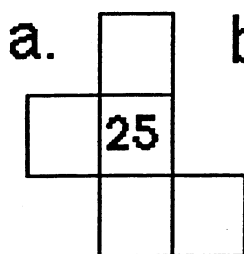
Name:_____

(This shows my own thinking.)

★★ 1. How old are you? ____
How old will you be in 10 years? ____

★★ 2. Circle the hidden facts.
Go across or down.
One is done for you.
Find at least 12 facts.

16	9	7	12	18	2	13
8	2	2	4	9	0	9
8	11	4	7	9	2	5
6	6	12	4	14	12	14
10	2	8	11	8	7	13
2	4	13	6	6	14	5
2	6	8	10	9	9	6
9	4	5	6	2	5	11

★★ 3. Find the pattern to fill in the missing numbers.

$\boxed{3} \rightarrow \boxed{8} \rightarrow \boxed{} \rightarrow \boxed{18} \rightarrow \boxed{} \rightarrow \boxed{28} \rightarrow \boxed{33}$

★ 4. You leave home at 4:15 PM. You must be home in an
hour and a half. What time must you be home?

Answer: _____

★★   5. Which animal won the pet contest? Circle the animal.

The winner's number is:
• less than the number of days in a week
• greater than 5 - 4
• not the number of toes on one foot
• not counted when you count by two's

1   2   3   4   5   6   7
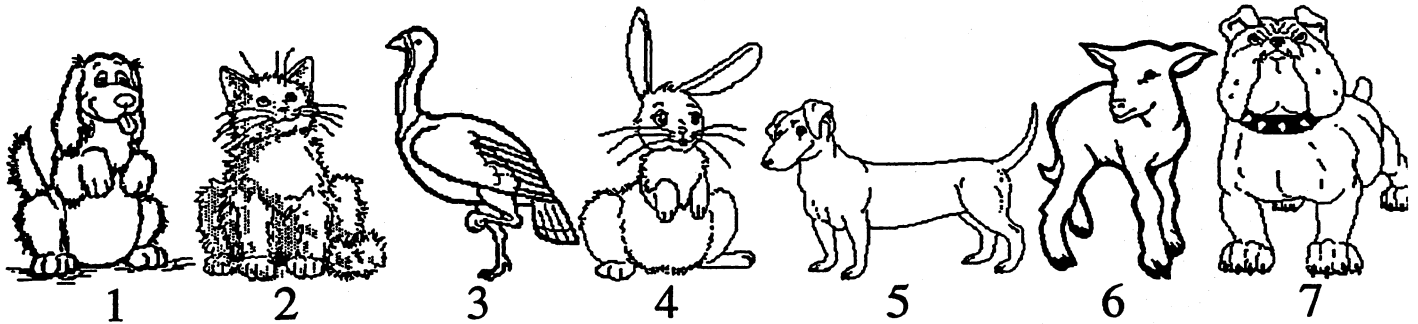
★★★★ 6. Help Fred the frog hop back across the pond. Fill in the missing numbers on the lily pads.

26   46   56   86
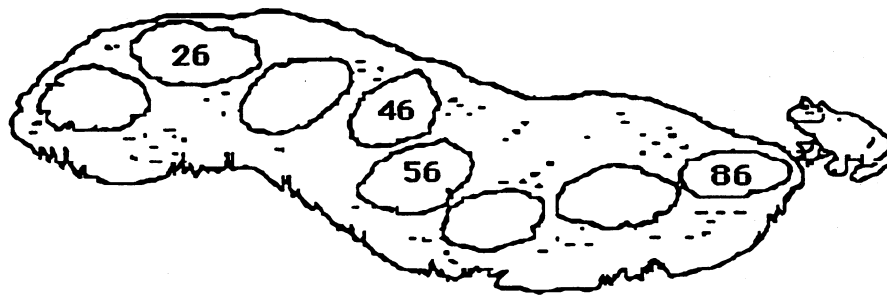
★★   7. You and a friend share 5 pieces of gum fairly. How much does each get? Circle the best answer.

• One gets three pieces, the other gets two pieces.
• One gets four pieces, the other gets one piece.
• Both get two and a half pieces.

Name:_____

(This shows my own thinking.)

★ 1. Which piece of pie is the biggest? Write the fraction.

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{8}$
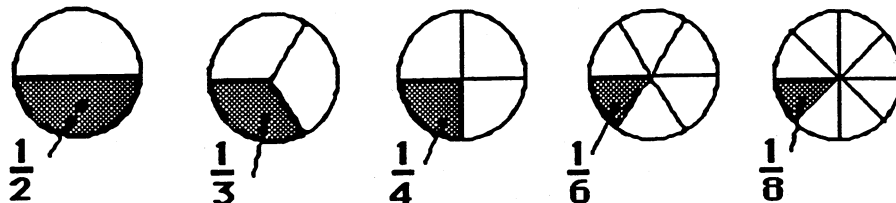
Answer: _____

★★ 2. Use the tax chart to find the tax for each item, and then write the total cost of each of the items below.

Tax Chart	
Cost of an item	Tax
From 1¢ to 20¢	1¢
From 21¢ to 40¢	2¢
From 41¢ to 60¢	3¢
From 61¢ to 80¢	4¢
From 81¢ to $1	5¢

25¢   50¢   88¢   61¢
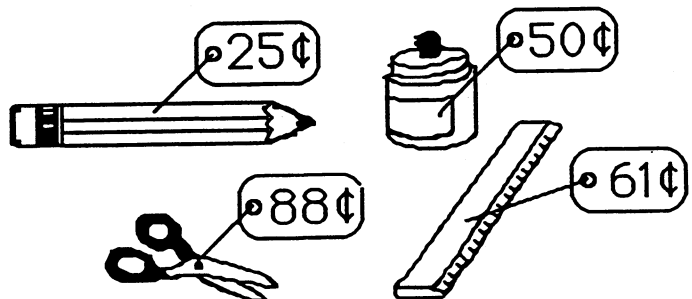
Answer: A pencil costs _____.   Paste costs _____.

Scissors cost _____.   A ruler costs _____.

★★ 3. Mary had $5.00. She bought bread for $1.00 and a candy bar for $1.00. How much change should she get from the store clerk?

Answer: _____

★★★★ 4. How many ways are there for 5 mice to live in two houses? Hint! Finish the chart.

🏠	🏠
0	5
1	4

Answer: There are _____ ways.

★★ 5. Help Fred Frog hop back across the pond. Fill in the missing number on the lily pad.

+ 6 − 7 = 2
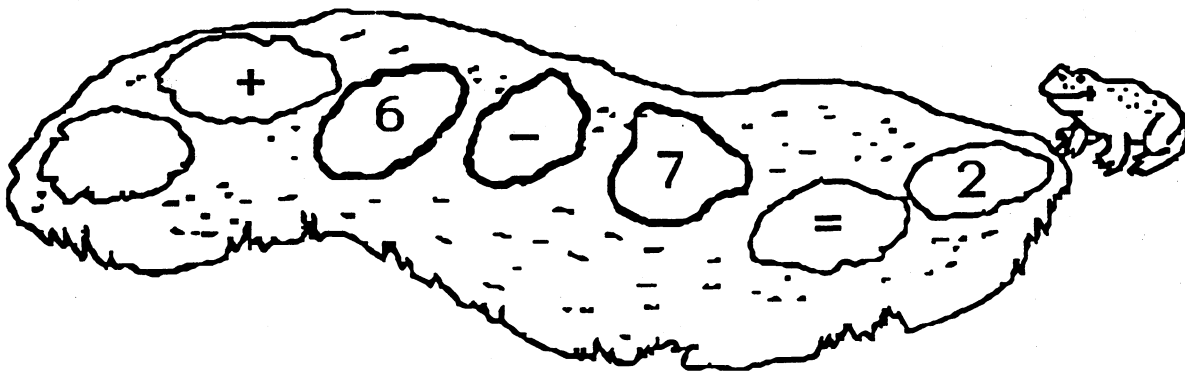
★★ 6. Wayne had to pick up a marble without looking. Which one did he probably get, black or white?

Answer: He probably got a _____ marble.
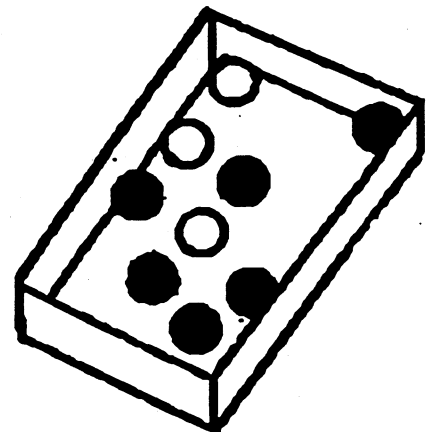
ANSWERS

Commentary
Venus, I

1. **(7)** $15 - 8 = 7$. Students might use cubes to represent the strawberries. Making up a story to go with the problem might help some students who have trouble. They are likely to solve the problem by *counting on.*

2. **(12)** $5 + 7 = 12$. Manipulatives to represent the bugs, or drawing pictures of the bugs, will help some students.

3. **(12)** 1st week-2 books, 2nd week-4 books, etc....6th week-12 books. Students who simply add or subtract the two numbers they see in the problem will need to act this out, with real books and a calendar.

4. **(fish)** The problem is an intuitive introduction to probability. The chance is greater for getting a fish because fish take up more area of the circle. Some students unfamiliar with spinners may choose "bird" because that is where the arrow is pointing to in the drawing.

5.

September	☺ ☺ ☺ ☺ ☺
October	☺ ☺ ☺
November	☺ ☺ ☺ ☺ ☺ ☺

6. **(A square divided into 5 sections.)** Be lenient with student's drawings. Some will have the right idea, but their small motor skills aren't developed enough to draw such a figure precisely. Have them describe their figure to you verbally, and give them credit if their description is correct.
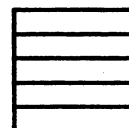
Commentary
Venus, II

1. **(A)** Students might want to cut out shapes like these, and see if they can make them fit. A is half of the square shape. The rectangle and hexagon will not fit the shape.

2. **(basket of berries and the truck)** 15¢ + 18¢ = 33¢.

3. **(Second Tile)** There are five dots on this tile. Each of the other tiles have seven dots.

4. **(Ben, Ken, Jen, Len, Zen)** Students might enjoy lining up like this themselves, to act out the roles. Drawing a picture most-to-least will also help answer the question.

5. **(9 + 4 = 13)**

6. **(6)** Most students can *guess and check* to find the mystery number. They would perhaps guess it was 5, then go through the steps and find that 5 was too small because you don't get 14. So they would revise their guess up. *Working backwards* might be appropriate for some students. For them, you would start by reversing the last step -- what did you have, before you added 2 and got 14? Then what number can you add to itself and get 12?

Commentary
Venus, III

1. **(3)** This is a simple subtraction problem.

2. **(See the square to the right)** Students need to see geometric figures that are not in the usual orientation. They need to know that figures remain the same -- squares, triangles, and so on -- when they are rotated.
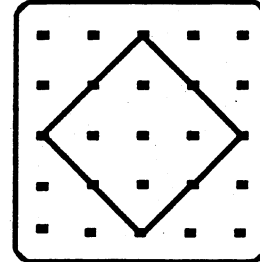
3. **(1)** Students will enjoy making their own survey similar to this one, and discussing the data. After they do so, this problem will be easy for them.

4. **(rectangle)** This may be the students' first introduction to the process of elimination. As they read each clue, they can write the name or initial on the shape. Then by process of elimination, the shape that is left must be Mark's.

5. This problem assumes that students have worked with a hundreds chart in class. If not, it would be necessary to introduce this to students before they attempt this problem. Based on the hundreds chart the student will see that each row is ten more than the previous row.

6. **(13 - Least; 96 - Greatest)** Students might enjoy taking only 2 digits at random from a stack of cards, and making both the greatest and the least number possible with those two digits. They can play a game in which each child draws 2 such cards from a deck, and the teacher draws a card at random that says either "greatest" or "least." The child who wins that round gets to be the teacher on the next round.

7. **(6¢, 9¢, 12¢, 15¢, 18¢, 21¢; ... 30¢)** Students will fill in the chart according to the pattern of counting by threes, or they might just count by ones each time. The final answer -- the amount for 10 pencils -- requires that they go beyond the chart.

Commentary
Venus, IV

1. **(5)** Students will probably add 2 + 8 + 1+ 3 = 14 and then subtract 14 from 19 to get 5. Some will start with 19 and subtract 2,8,1, and 3 to get 5. Others may *guess and check.*

2. **(8; 16; 32)** Students can count the cats to decide how many tails, although not all the tails themselves are visible. They can also count the ears, since they are visible. The challenge is to count the legs -- they are not visible, and a child will have to count four per cat.

3. **(8 o'clock)** If a student knows that the answer is 8:00 but doesn't know how to draw the clock hands, give them partial credit.

4. **(10)** This problem could be modeled by taking 5 pieces of paper, 1 per bug, and cutting them apart. An extension of this problem, which will come up in later years, is to consider what happens when those 10 bugs break in half, and then those 20, and so on.

5. **(The chart would be similar to that below.)**

Child Pulling	Child Riding
Alice	Sam
Alice	Kevin
Sam	Alice
Sam	Kevin
Kevin	Alice
Kevin	Sam

6. **(6)** The problem involves both adding and subtracting, and also has extraneous information. The two positive runs are added, and the yardage lost is subtracted. The jersey number has nothing to do with it. Some students might not know what the terms mean, if they are unfamiliar with football. It would profit those students to have a little about the game explained to them before they attempt the problem.

7. **(10)** Students can draw triangles in the large shape, to cover it. 12 triangles exactly fit, and this number is closer to 10 than to 5 or 20. A visual estimate should tell students that 5 is not enough, a 20 is too large a number.

Commentary
Venus, V

1. **(5 dots, 3 dots, 1 dot)** The first box has 11 dots, the second has 9 dots, the third has 7 dots. The pattern is then the odd numbers, counting backward from 11.

2. **(The marked thermometers are shown to the right.)** Each line on the thermometer represents 10 degrees, although this will not be obvious to all students. They may have to be prompted to see what number they count by -- *ten* -- starting with zero, to get to 50 at the 5th count. Practice in counting by tens should help. The second thermometer requires that they realize that 65 is half way between 60 and 70. As students practice counting by tens, this can be an extension.

   (Don't expect the children's marks on the thermometer to be precise.)
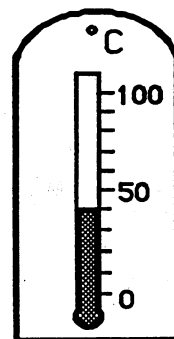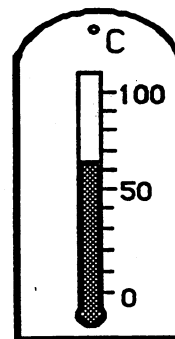
3. Students can *guess and check* with + and - to find the answer. Or, they might notice that + had to precede 6 since it's impossible to add the three previous numbers, subtract 6, and get 11. So the three numbers before 6 must turn out to be 5, once the computation is done for them. This makes the problem simpler.

$$3 \boxed{+} 4 \boxed{-} 2 \boxed{+} 6 = 11$$

4. **(2)** Fair shares is a good way for students to meet division before ever knowing how to perform the operation with numbers. The problem would be easy if the 6 cookies were grouped 2 to a plate, but here students will have to take one from both plates and give if to the middle person, to divide them fairly. They might draw lines from each child to 1 cookie, to show giving them out, then a second line.

5. **(14)** Students can actually act out a problem like this, using paper instead of crayons.

6. **(40¢)** Drawing a picture of the cards with buttons on them, till you have 12 buttons, will help students. Then they can label each card with 10¢, and count by tens to find the total.

7. **(10)** The pattern is that the white squares increase by 1 each time you move to the next figure --1, 2, 3, and so on -- and the grey squares increase by 2 each time -- 4, 6, 8, and so on. Therefore the next number of grey squares would be 10. Some students might draw the next picture, and actually count the grey squares to verify this answer. An extension of the problem would be to continue the pattern further.

8. **(a. hands, etc.; b. fingers or toes; c. hair)** The notion is for students to think about numbers that come naturally to them. Part (c) requires them to think about a large number, but one that is "real-world" to them.

Commentary
Venus, VI

1.

Less than 11	Greater than 15 less than 28	Greater than 36	Numbers that do not belong in any basket
10, 3, 2, 5	1 7, 26, 20, 19	39, 42, 48	29, 31, 34

This problem will show which students have an intuitive feel for numbers that are greater than or less than other numbers. The middle basket requires that a number meet two conditions, and this will be new to many students. A help would be to indicate the "critical numbers" 11, 15, 28, and 36 on a number line, with a basket drawn under the set of numbers that match its conditions. This will provide a visual interpretation of the problem.

2. **(2¢)** Students should have an intuitive knowledge of a dime being 10¢ and a nickel being 5¢, and the two together being 15¢. Therefore removing 13¢ from 15¢ leaves 2¢.

3. **(3, 11)** Students can subtract 4 from 7 to find the answer that belongs in the box, or they might find it simply by knowing that 3 is the number that adds to four to give seven. In either case, 3 is then added to 8, giving 11.

4. **(20 and 50)** Students might find the boxes in a number of ways. They might start with the largest, 50, then *count on* by tens for the box of 20. Or they might simply add the numbers as 5 tens plus 2 tens, getting 7 tens or 70. Or, they might use a calculator and add 20 + 50.

5. **(bottom)** Taking out three blocks, labeling them with the 3 colors, and stacking them up according to the two conditions will help students who have trouble with this problem. One possible source of difficulty is that the symbols on the blocks (6, A, and P) are arbitrary, but some students will assume they have meaning in the problem.

6. **(8)** Students can count the concentric triangles, as well as the individual ones. Some will have trouble with the triangle with a square in it, feeling that this somehow is disallowed. Or, they might count the square, not distinguishing it from a triangle.

Commentary
Venus, VII

1. **(14; 35)** If the dog ate 9 flies, then the cat ate 12 flies and the bird ate 14 flies. Together they ate 9 + 12 + 14. This problem may be troublesome for children because you don't simply add or subtract with the numbers that appear. It might be helpful if they act out the situation, using manipulatives, stressing the words *more than* in the problem.

2. **(20)** If one lamb has 4 legs, 2 lambs have 8 legs, and so on to 5 lambs having 20 legs. Students might draw stick figures of the lambs, and count their legs as they draw them.

3. **(2)** If one truck costs 13¢, then 2 trucks cost 26¢. You can only buy 2 trucks for 30¢, and you'll have 4¢ left. A student might want to act this problem out with 30 pennies, putting down 13 for each purchase.

4. **(ABC)** Since B belongs to the square and the triangle, it counts as belonging to the triangle.

5. **(46)** As 4 tens are 40, the *tens* place has a 4 in it. Therefore there is a 6 in the *ones* place. Students might enjoy doing some more "mystery number" games like this, giving a hint as to either the *ones* or *tens* digit first, then the other.

6. **(–, +)** Using trial and error, the student can put the correct symbols in the circle to make sense.

$$13 \ominus 4 \oplus 8 = 17$$

7. **(10)** Research is beginning to show that students coming to first grade already have intuitive knowledge of some fractions, and "half" is one of those. They may not get this problem correct, but many can divide a collection of food or other such common objects among several children. In this case, two children could act out the roles, one starting with 20 pennies and the other with none. They would divide them by going "one for you, one for me," and so on.

Commentary
Venus, VIII

1. The outside figures which repeat are square, oval, then triangle. Also, there are two lines in the first set of three such figures, then one line slanting down from left to right in the second set, then one line slanting up from left to right in the third set. The last figure is shown to the right.

2. **(One clock should show 2:30 o'clock.)** Students have a choice in this problem of the way they should answer. A student who knows both ways of recording time should receive an extra, bonus star.

3. **(5 times)** Students can draw a picture to solve the problem. They should be encouraged to count by tens also.

<div align="center">

bed   bed   bed   bed   bed

10¢ 20¢ 30¢ 40¢ 50¢

</div>
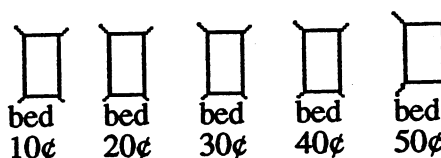
4. **(4)** Students could write all the numbers from 1 to 40, and select those with a 7. Some will be able to do this problem mentally, by thinking 7, 17, 27, 37, perhaps by counting out loud.

5. **(a. > b. = c. <)** Most students will be able to add the amounts of money on each side mentally. If not, they can use a calculator. The difficult part, but important, is for them to write down or remember what sum they get for each side, until they have computed the amount on both sides, and can compare.

6. **(15)** Counting all the days from December 17 to 31 is the most likely way that students will find this answer. A calendar presents a lot of patterns for students to look for, and might be useful in other math activities.

7. **(17, 20, 31)** It is interesting and instructive for students to see a model of a function machine, of which this problem is one type. They will enjoy having a physical model of such a machine, as shown below, with a dial that really turns. Then they can play a game with each other, with one making up a rule (the rule setter)and "setting the dial," and the other giving **In** numbers. The rule setter thengives the **Out** number, and they record this on a chart. After the rule is discovered, the roles are reversed.

For an extension of this situation, once the rule is discovered, have the student give an **Out** number, and the other student try to decide what number went **In**. Do not stress reversing the rule -- allow them to decide on the **In** number simply by intuition.

IN

(Dial for setting rule

OUT
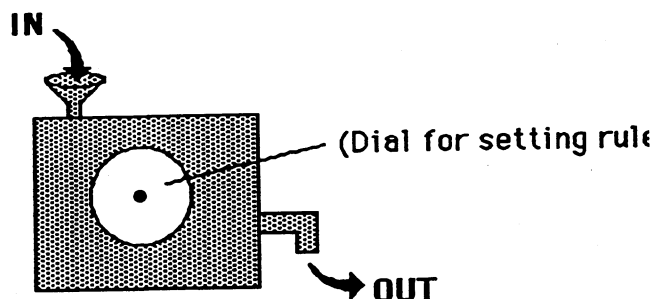
Commentary
Venus, IX

1. **(43¢)** The ears, nose, and teeth are 9 triangles, which costs 27¢. The two eyes are squares and cost 10¢. The face is a circle and costs 6¢.

   Students might practice this problem with a different shape, such as the house and two bushes to the right.
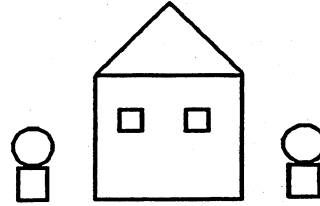
2. **(20 or 21 cm)** Students will solve this in different ways. Some will count by ones from 4 (or perhaps 4 1/2), up to 25. Some might count by ones, but start at 25 and work down to the other end, 4. Others will mark the length of the tape dispenser on a piece of paper or another object, and hold that distance up to zero on the scale and read the other end. Others will count backwards (25, 24, 23, ...) down to 4, but then they won't know the answer unless they know how many times they counted. A few might subtract 4 from 25.

3. **(9, 11)** Students might practice making patterns like these out of tiles, cubes, or other manipulatives. A prompt might be to ask students having difficulty with such problems -- how do you get from step 1 to step 2? How do you get from step 2 to step 3? This will encourage them to relate each figure to the one which immediately follows or precedes it. Students who are unfamiliar with patterns might have trouble focusing on the parts of the pattern, and be looking globally at the design.

4. **(19)** Students might *guess-check-revise* for this problem. That is, they might try a number like 10 to start, and see if they get 13 after subtracting 6. They then revise their guess of 10 accordingly.

5. **(3)** To balance the scale, the student has to draw three apples on the right side of the scale. A key to solving such problems is some familiarity with balance scales in the classroom, knowing that the same weight must be on both pans for the bar to be horizontal. This model is important for later work with Superstars as a balanced scale is a physical embodiment of the way the equals sign is used in mathematics.

6. **(4)** Students will approach this problem in different ways. Some will count out individual pieces one at a time for the 4 kids, till all are gone. Others will divide each pizza into four equal parts, so each kid will get 2 pieces from each pizza for a total of four. Still others might think initially that 2 kids can share both pizzas, and cut each pizza in half and thus give 4 adjoining pieces to each kid.

7. **(48, 46, 45, 86, 85, 84, 65, 68, 64, 56, 58, 54)** Students might practice this problem with only 3 cards first, and different numbers than the four given.

Commentary
Venus, X

1. **(12)** Students need to include Jill with her five friends to make six children. Drawing a picture of each child, and 2 cupcakes per child, will help find the answer by counting.

2. **(25¢, 10¢, 5¢, 1¢, 1¢)** A good strategy is for students to start with the largest coin they can, and work from that. In this case, start with a quarter because 2 quarters is too much. Then add a dime -- two dimes are too much. Continue in this fashion.

3. **(Saturday)** If students are unfamiliar with a calendar, they might not know to place a 1 in the box under Thursday, and a 2 in the next box, and so on. Practice problems like this could involve looking at a real calendar for the present month, and discussing questions similar to these, to familiarize a child with the way a calendar is set up.

4. **(First grade)** The Kindergarten class has 28 students, while the first grade class has 29 students.

5. **(10 squares)** Each window pane is a small square, and the window frame itself counts also. Therefore each window actually has 5 squares showing. The two windows together would therefore have 10 squares.

6. **(accept any answer from 6 to 10, (8 to be exact))** Students with good visual estimation skills or accurate drawings skills might find a reasonable answer without using a real object such as a plate. A nickel is about the same size as one of the plates shown, and so can be used repeatedly to get a good estimate.

7. **(12; 6)** Some students will forget to count the fourth wheel on the car, because it can't be seen. Another common mistake is to either not count the two friends, or count the two friends but not yourself. This problem involves a concrete example of ratio -- 4 wheels to each car; 2 headlights to each car. Similar problems would involve considering a real car and additional ratios -- seat belts, air bags, radio speakers, and so on. Other transportation objects offer more possibilities -- bicycles, big wheels, wagons, skates, and so on.

Commentary
Venus, XI

1. **(15¢)** Some students may give the answer as coins, instead of as 15¢. They may say they would get back a dime and a nickel, or 15 pennies, or some other combination. Students who have trouble with this problem might want to play a game with a partner, one being the clerk and handing over the change, and then switch roles. They would start counting back the change a penny at a time, and then move to other coins.

2. **(22)** 6 + 4 + 4 + 4 + 4 gives 22 steps. Walking off the paces is an active way of getting the answer. Students might also draw a diagram, with each step marked off.

3. **(9)** The key point that some students will overlook is that Jessica must also be counted. Making a "stick figure" diagram helps students see Jessica also.

4. **(6 + 6 = 12)** Students need to draw in 6 dots to make the domino a double. Then 6 + 6 = 12 is the addition sentence.

5. **(6)** An answer can be obtained by visually marking off the length of the paper clip several times in a chain, or measuring it and marking it off accurately. Some students might come up with an answer of 3, 3 1/2, or 4, because they used a real paper clip instead of the one shown. They should get their stars for this -- the problem doesn't say to use the one shown as the standard unit.

6. **(26)** Students can *count on* and *count back* to find the answer mentally. Some students will find it troublesome that, the way the problem is laid out, the single digits 3, 2, and 1 are lined up under the tens digit of 24. They might be tempted to combine the digits that are lined up, rather than considering the numbers in context. Acting out the problem should help.

7. **($6)** This problem leads into the next one, problem 8. Hopefully students have previously encountered a sequence of steps to be followed to solve a problem -- a flowchart is simply a way to visualize those steps. Students who have trouble might go through the steps with play money.

8. **(6)** This problem reverses the thinking pattern of the problem above, number 7. In it, students are asked what number they start with so that, after the steps are followed, they get the end result stated. There are two generally approaches to this type of problem -- *guess-check-revise* to find the start number, or *work backwards* by reversing the steps. If this is their first encounter to such a problem, *guess-check-revise* is the best approach. Students are encouraged to simply guess a start number, do the computation, and if they don't get the indicated answer, guess a higher or lower start number because of what they learned. They keep *guessing-checking-revising* until they are successful.

Commentary
Venus, XII

1. **(scissors, phone)** The pattern is repeated after every third term. The 10th figure is called for because it is the next one not shown. The 14th term is then called for, as this encourages students to predict "down the line" what might appear. Students will enjoy making their own such patterns, and using them with other students.

2. **(B)** One out of four equal parts of the square is shaded in. Most students will not have encountered these names in their formal schooling yet, but some will have an intuitive notion of the word names for these simple fractions.

3. **(72)** Counting by tens, there are 7 tens and 2 which is 72. In experiences leading to this, the tens and ones should be "mixed up" from left to right, so the child has to sort out the tens and ones based on their size, rather than the way someone has already grouped them, as is displayed here.

4. **(8)** There are 6 small triangles around the edges, and then the two large triangles themselves. The purpose of this problem and similar ones is for students to see both the overall structure of a design, and also the small parts that make it up.

5. **(One solution shown below.)** Try a *guess and check* strategy. Try 6 numbers in different places until you find the combination that works. Be sure the sum along each side is 6. A hint might be that the 5 and 6 need to be "separated."
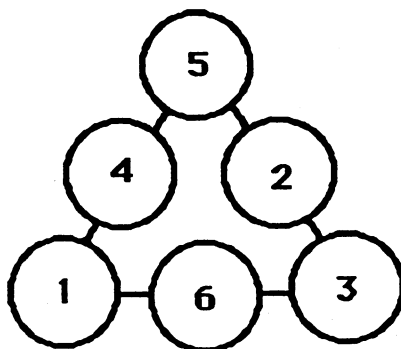
6. **(2, 2; 4,3; 4,0)** This problem is an introduction to the Cartesian Coordinate system. It is important that students remember to go <u>east</u> first, then north. Although this is merely a convention, it is an important one to keep in mind.

7. **(11:00)** Showing time on clocks will be new for some students, but not for others. Students are asked to respond using both types of common clocks. The time increments in the problem are limited to "half hours" so that students can intuitively add the time periods.

Commentary
Venus, XIII

1. (**Rope = 54¢, Quilt = 79¢, answers will vary**) Students will enjoy adding up the values of certain familiar words, as practice for this problem. They will enjoy seeing whose name "costs the most," and so on. Note that some students may interpret "Your first name" as finding the value of those three words, which is 184¢.

2. (**A. 8 B. 13 C. 6**) Students need to count <u>all</u> the stars in the given shapes. This is a Venn diagram-type problem.

3. (**Tiger**) The tiger weighs more than the bear because his side of the scale is lower. A balance scale will be used in many problems in Superstars in the years to come, as it provides a physical model of an equation.

4. (**The ornament and pencil.**) This problem involves symmetry. The ornament has a vertical line of symmetry, and the pencil has a horizontal line of symmetry. It is interesting to see if students color one of these two but not the other, i.e., do they more easily see one type of line of symmetry than the other type?

5. (**C: 4 meters**) Visual estimation is the key to success with this problem. If it's 2 meters from Susan's to George's house, then it's about that same distance from George's to Mary's and from Mary's to Barry's. So it's about 4 meters from George's to Barry's house.

6. (**6**) Students who have trouble with this problem can approach it in one of several ways. The way used most often is to simply trace the paths with their finger, and try to count them as they go to a new one. Hopefully they will try an organized approach to this problem, such as using only path A and seeing how many ways there are, then moving to B and seeing how many ways there are. Students might try making an organized list, such as: AC, AD, AE, BC, BD, BE.

Commentary
Venus, XIV

1. **(40¢)** It will help students to draw a diagram. Each cut is 10¢, but it takes 1 less cut than the number of pieces needed. Five pieces will take 4 cuts, giving 40¢ for the cost. Students might enjoy acting out this problem or similar ones, cutting a piece of string.

2. **(A)** Students with good visual discrimination skills will have no trouble with this problem. Others might choose to trace over the cut-out area, cut it out, and see which one it fits.

3. **(7¢)** The problem involves the concepts of *greater than* and *less than*, in one problem. In this case, the words are used naturally with coins and should be more meaningful to students than if the words were used simply with numbers. Similar problems used in the classroom will develop this skill in children in a natural way, before it is met in a more formal setting, and with symbols > and <.

4. **(about 30)** The students can see only "7 - 4", but they know that this means "seventy-something minus forty-something." The answer to that is "about thirty-something."

5. **(5)** For this problem, students might actually lay out rows of 10 stars each, until they have 50 stars, or make such a drawing. Students will enjoy drawing an American flag, given this information and the picture showing the 13 stripes.

6. **(3 to 5, (4 to be exact))** Answers will vary, but this range is appropriate. Some students might want to take a coin about the size of the cat, and move it around the mat to get an estimate.

7. **(Use your judgement.)** The tail should not be real short, or real long. Anything that is reasonable should earn credit. The actual picture that this drawing was taken from is shown below. Notice that the tail doesn't look quite as long as the height of the kangaroo, but that's because it is curled up.
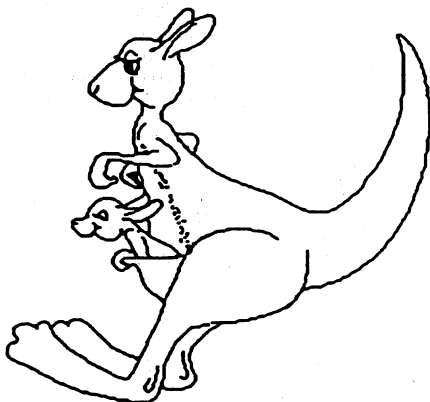
Commentary
Venus, XV

1. **(Check rectangle drawn on paper.)** The first problem is to encourage students to draw a rectangle of a certain size, enabling them to find the perimeter in the next problem. Some students will not know what a rectangle is, and others might not know how to measure with a ruler yet. For the latter student, encourage them to use a "centimeter cube" or some other device that can be repeatedly used as a single unit to measure distances.

2. **(20)** This problem gives an intuitive introduction to *perimeter*, although the word should not be introduced as yet. Students can find the answer by counting $3 + 7 + 3 + 7$.

3. **(Out: 8; Out: 12; In: 27)** Students are introduced to a function machine in this problem. They will enjoy having a machine like this in class, made from an old box with a plastic lid for a dial and a funnel for the "In" chute, and pretending to "set the dial" for each other, filling in a chart to see who can guess what the dial is set to do. In the first two parts of this chart, they subtract 7 from the input number. In the last entry, they must decide what the input number is, for the output of 20.

4. **(yes)** Richard has 38¢. If he spends 10¢, he'll have 12¢ left, which is enough for the 10¢ eraser. Some students might have trouble with this problem if they don't know the value of coins, and so can't find the initial amount of 38¢.

5. **(4)** This is the first introduction that students have in *Superstars III* to a pictograph in which the symbol stands for a number other than 1. Some students will find the total for both milk and soda, and subtract 6 from 10. Others will note visually that there are 2 more symbols beside milk, each representing 2 cups, and get 4 cups that way.

6. **(9)** This is a simple addition problem. Students might make a mark for each truck and count, or they might add the numbers they see in the problem.

7. **(5:30)** The problem involves *process of elimination*. The first and second clues eliminate 4:00 and 6:00 o'clock respectively. The last clue eliminates 5:00, leaving 5:30 as the correct answer.

8. **(104)** Students will solve this by adding 26 four times. A calculator should be encouraged.

9. **(11)** Students must use visual clues to see that the duck weighs 5 and the duck and cake together weigh 16. Therefore the cake alone weighs 16 - 5 or 11 ounces. Students will enjoy making up problems such as this for each other, in the regular classroom.

Commentary
Venus, XVI

1. **(One solution shown to the right.)** The numbers may appear on the array in a different position. Students will likely solve this simply by guess-check-revise. A few might notice that, since 9 already shows for each line, the other two entries on a line must total 10. So 8 can be matched with 2, 6 with 4, and 3 with 7.
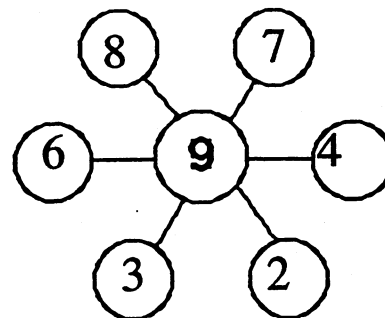
2. **(Jan 10, 4, Jan 23)** Students should be familiar with a calendar by this point in the first grade. They have likely played games similar to the questions asked, alternating roles with other students to ask the questions. In a previous *Superstars III* activity, students were asked to actually place the numbers on such a calendar.

3. **(157)** This problem is not new to students, except that in their books they might have always seen the blocks already arranged for them, from biggest to smallest, left-to-right. This problem requires that they understand that they must collect the tens together and the units together, before proceeding. This problem, then, is at a little higher level than typical ones found in their textbooks.

4. **(a. 10 b. 30)** This problem is an intuitive introduction to *rounding off to the nearest ten*. However, at this point students should find the answer by pointing out about where 13 and 28 are on the line, and visually comparing their distances to the numbers asked. Placing the numbers 13 and 28 on the line involves *number sense.*

5. **(8, 2, 12 and 16)** This pictograph involves a key. Students previously considered such a pictograph, but there was only one symbol used in the chart. Here two are used, introducing more complexity but also more opportunity for growth.

6. **(10)** The pencil has already been "lined up" for students, so all that is required is that they count the boxes to find the length.

7. **(Measure the student's drawing for 7 cm .)** In this problem, the student must use 7 centimeters from the picture above as the length, and sketch a pencil this length. This problem is more activity-oriented than the previous problem as students are asked to actually produce a figure.

Commentary
Venus, XVII

1. **(15 pennies)** Students can actually make the additional rows with pennies, or they might draw the pennies needed. Some will notice that each new row means the next consecutive number of pennies is added -- e.g, 4, then 5, then 6, then ....

2. **(The calculator is working fine.)** Although students this young haven't computed with decimals with paper and pencil, they can do this problem on a calculator and see what kind of answer they get. It makes intuitive sense to them, at least with money at this stage, that $7.00 means the same as $7.

3. **(3 inches)** The ruler must be placed so that the object being measured starts at zero, to read the inches directly. A few students might not align the object at zero and still get the right answer, by counting the inches from where the object is aligned on the ruler.

4. **(5)** Students might do this problem on a calculator. Some who do it from left to right, one number at a time, will notice the pattern of the build-up for every two numbers considered. I.e., 10 - 9 gives 1, then add 8 and subtract 7 and you have 2, then add 6 and subtract 5 and you have 3, and so on. Students will enjoy doing patterning problems such as this.

5. **(Yes)** The answer is yes because 12+14+7=33, and since you have 35 candles there will be enough. Students might approach the problem by drawing a picture of the candles and counting, or perhaps by addition.

6. **(May 7th)** If yesterday was May 5th, today is May 6th and tomorrow will be May 7th. Some students will forget to count "today" since it isn't mentioned in the problem.

7. **(a. 5; b. 5; check the student's graph)** The bars on the graph should extend up in the same fashion as from April through July. Follow-up questions could involve the overall number of grams gained from April through October, and what would likely happen to the graph over time (the chick wouldn't continue to grow at this rate).

Commentary
Venus, XVIII

1. **(6¢)** Students will need to know that a dime is 10 pennies, and four more pennies is 14¢. Therefore 6¢ more is needed to get to 20¢. Some will count up from 14 to 20, and some will subtract.

2. **(lions, elephants and bears)** Rachael is too late to see the monkeys and too early to see the zebras and giraffes being fed. This problem involves reading a chart and using knowledge of time.

3. **(6 tails and 12 eyes)** Students might draw the lions with stick figures, with 4 legs on each, till they have 24 legs. Then they can count the number of lions they drew, put a tail on each, and have the first answer. They might put two dots on each stick figure for the eyes, and count to get the second answer.

4. **(18 blocks)** Each tower has 6 cubes, but one of them is hidden from view. If students actually make one of the figures, they will readily see this.

5. **(neither)** The twins ate the same size pieces. The best way to demonstrate something like this to students is to take 2 identical squares made of wood and cut them in the two ways shown, then weigh one piece from each cut. The two pieces should balance. If you try this with an actual sandwich, be sure the bread is square or rectangular, without rounded corners, or the "halves" may be off somewhat.

6. **(17, 14, 36)** Many students will not realize what these symbols mean, and others will see it naturally. Those who have trouble probably don't realize that the first number shown is where you begin, and the arrow shows movement from that spot on the chart to another number on the chart. The second number is where you end up on the chart. Students can practice this by placing a finger on the start number, then moving with the arrow to the final number called for by the box.

7. **(7)** This problem involves three of the arrow movements. These problems can be extended in the classroom by introducing the other arrow movements not shown, by stringing together more arrows, by using arrows which cancel each other's movement, and even by giving the arrows and the end number, and asking where you started.

Commentary
Venus, XIX

1. **(4, 1 or 3, 11, or 2, 21, or 1, 31, or 0, 41 are all acceptable.)** Most students will find this answer with no trouble. The most likely answer is to have the most dimes possible, but other combinations of dimes and pennies to make 41¢ are acceptable. Notice that there is extraneous information in the problem -- this might bother some students, if they have never met a problem of this nature previously.

2. **(The bags with 80 rocks and 60 shells should be circled.)** Students will need to compare the two bags of rocks and two bags of shells, looking for a difference of 20. By process of elimination (60 rocks and 50 shells won't work, for example) they can find the answer.

3. **(1, 3, 4)** Students can find this answer by trial-and-error.

4. **(5)** The problem is an excellent one for which to draw a diagram. Such a diagram is shown to the right.
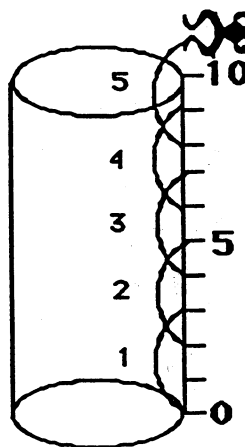
5. **(9, 6, 9 - 3 = 6; 9, 5, 9 - 4 = 5; 9, 2, 9 - 7 = 2)** The only difficult part of this problem is that the number to be removed is not recorded, until it's written in the number sentence. Students who have difficulty with this problem might perform better if they have real objects shaped as triangles, squares, and circles, and a 3-by-3 board, and remove the objects as directed, recording as they go.

6. **(24)** Some students will make the marks in the boxes, and simply count by ones to find the answer. Others at a little higher level, will count by 5's and then by 1's. Others might add four 5's and then four 1's, and still others will put two groups of 5's together, and count by tens.

Commentary
Venus, XX

1. **(17¢)** The problem is a two-step one for most students in that they must first determine that a quarter and 2 pennies is 27¢. Then they must find the difference in 27¢ and 10¢. Some student will think of it as a one-step problem since putting a quarter and 2 pennies together to get 27¢ is something they won't consciously think of doing.

2. **(4)** Students might use 3 identical physical objects to represent the apples, and 12 identical cubes or other objects to represent the weights. Their problem is then to divide the 12 cubes fairly so that each apple has the same number of cubes.

3. **(4)** The student needs to align the "zero point" of an inch ruler with the end of the pencil, to read the number of inches directly. Other might align the end of the pencil with any inch mark, and count inches from there.

4. **(2nd)** The problem uses visual clues and process of elimination to determine Pete's position in line. The problem relies on students being familiar with "See no evil, hear no evil, speak no evil." The first clue depends on a student knowing that the "friend that speaks no evil" is the one with his mouth covered by his hand--the 3rd monkey. From this first clue, we know that Pete is 2nd or 4th. The second clue eliminates Pete being 4th.

5. **(4)** Some students might need to write the numbers from 1 to 30, but others can simply visualize them in their minds. The numbers which would have a "3" are: 3, 13, 23, and 30.

6. **(Answers will vary.)** Students should draw a picture made from circle, triangles, and squares, totalling 18¢. Two such are shown below. The figures might overlap, as the circles (wheels) do in the tractor below. Also, students might draw rectangles instead of squares, which is acceptable.
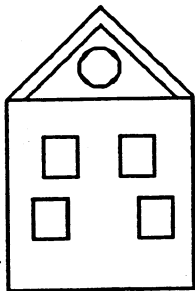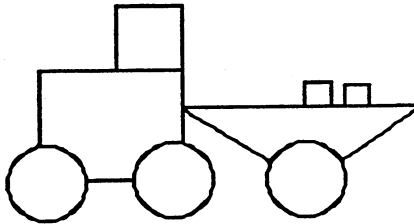
House   **Tractor and wagon**

Commentary
Venus, XXI

1. **(9)** Students will likely make their jumps on the number line itself, with their pencils. It would help them to make single jumps of 3 units each time, rather than 3 small jumps of 1 unit each, for each jump.

2. **(10)** Students will solve this in two ways. One is to simply go through all the jumps above, but starting at a different place on the line. The other way is to notice that starting at 1 will shift the whole action over 1 place, meaning that the frog will end on the number for the problem above, plus 1.

3. **(10)** Spatial visualization is needed on this problem, unless real blocks are used to duplicate the figure. There are blocks hidden from view which must be accounted for. It's possible that more blocks than 10 can be used for this figure, with even more hidden from view than are necessary to build the figure as seen.

4. **(10)** The constant feature of a calculator is featured in this problem. Students may be curious about this feature, and explore *counting by fives* or *counting by any number* using this feature. Note: Not all calculators have this function. Encourage students to compare what happens with different calculators.

5. **(1 quarter, 1 dime, 1 nickel, 1 penny)** The answer may be drawn or written. Students hopefully will start their approach by using the largest coin possible (a quarter), then moving to the next largest, and so on.

6. **(6, 6)** The number in the middle box can be found first, as the other two numbers that sum to 18 with it vertically, 10 and 2, are known. So this number has to be 6. This means the other box must have 6 in it also, with similar reasoning. Some students will use logical reasoning such as this, while others may simply *guess-check-revise.*

7. **(3)** Students will have intuitive knowledge of "half of a number" by this point in first grade. This problem is a two-step problem that first involves finding half of eight, then removing one of those. In such problems, students should be encouraged to follow the steps with real objects, rather than computation.

Commentary
Venus, XXII

1. **(Joe -- 20; Keesha -- 25)** The problem has two steps. The first step is to add 10 to Karen's points to get Keesha's, and the second is to subtract 5 from Keesha's to get Joe's.

2. **(30¢)** Most students will first use the second clue to find the cost of an orange at 20¢. This is done intuitively, rather than with the formal process of division, by asking themselves "what price, added 3 times, gives 60¢?" If students have trouble with this step, they might represent 60¢ with 6 dimes, and then divide the dimes into 3 equal piles. The first clue is then used, knowing that an apple plus 20¢ is 50¢, to find the cost of an apple at 30¢.

3. **(6)** Students might be encouraged to circle the angles. The two right angles will be easy for them. The other four will be less obvious as they are closer together on the tag, and are obtuse angles which means they don't appear as "sharp" to students. Note, some students might give a very large number as an answer -- if they have tried to count the angles in the small stars, they should be given extra credit for noticing something that wasn't intended.

4. **(The pictograph is shown below.)** The main point of this problem is for students to use the key correctly.

Jane	☺ ☺
Bill	☺
Tom	
Sue	☺ ☺ ☺

5. **(Answers will vary.)** Check to see if there are 20 tally marks. Then check to be sure that the face with the most tally marks is circled. If two faces have the same number, then both should be circled.

6. **(23)** This problem encourages students to use *number sense* to look for easy ways to compute. In this problem, they look for numbers that sum to 10, and put those together first, adding on the remaining numbers as necessary. Some students will not do this, of course -- they will simply add the numbers in the order in which they appear. Such students should be given credit if they succeed with the problem below, but should be encouraged to make their computation easy, when possible.

Have this problem on several 3 x 5 cards, for students to look at when they hand in their paper. The student is only allowed to write the answer, not any steps in getting the answer:

```
Add in your head:
     6
     8
     4
     3
   ±2
```
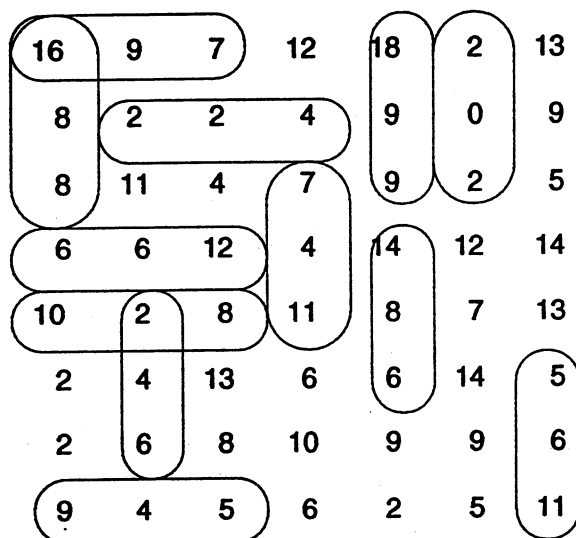
Commentary
Venus, XXIII

1. **(mitten is 3, 1; chair is 4, 3; key is 1, 2; moon is 5,4)** This problem is an intuitive introduction to the Cartesian Coordinate system. The horizontal distance is always given first, followed by the vertical distance. Even though this is merely a convention, it is a standard one and students might profit from learning it at an early age.

2. **(6)** This problem is multi-step, but students can act it out or draw a diagram to find the answer easily. Some students will forget to count the mother cat and hamster, along with the babies.

3. **($, ¢, ¢)** Students should use their common sense to judge which amount of money would be likely in each situation. A new shirt wouldn't cost 10¢, for example, but $10 is likely.

4. **(1 is Rule B; 2 is Rule C; 3 is Rule A)** Students should match the verbal clues with the three sets of geometric shapes. Some clues apply to individual objects in two sets, but not to *all* the objects in that set. The key for students is that the rule must apply to all objects in the set.

5. **(The answers are shown below.)** It is hoped that students will use this problem to begin looking for patterns in the typical charts they see in school, the hundreds chart being a prime example. They might notice that the numbers directly above or below each other differ by 10, for example. The numbers beside each other differ by 1, and the numbers diagonally connected differ by 11.

a.

	15	
24	25	
	35	36

b.

25	26	
	36	
46	47	

c.

	29
	39
48	

d.

5	6	7
14	15	
	25	
	35	
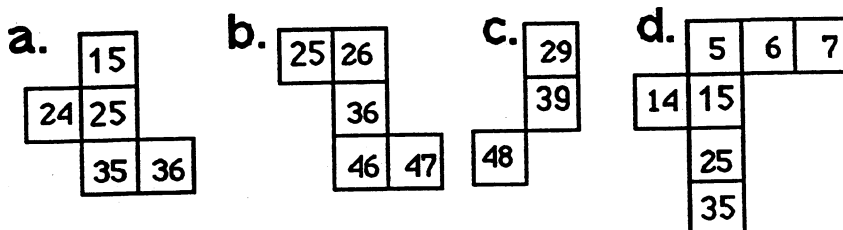
Commentary
Venus, XXIV

1. **(Answers will vary.)** The problem involves personal data, and the child is to add ten to their age.

2. **(At least 12 facts to earn 2 stars)** Others, besides the ones shown, are in the chart.

16	9	7	12	18	2	13
8	2	2	4	9	0	9
8	11	4	7	9	2	5
6	6	12	4	14	12	14
10	2	8	11	8	7	13
2	4	13	6	6	14	5
2	6	8	10	9	9	6
9	4	5	6	2	5	11

3. **(13, 23)** Students will likely notice that the numbers differ by five.

4. **(5:45)** Students might think of showing 4:15 on an analog (non-digital) clock, and then going around one full turn and another half turn, to increase the time by 1 1/2 hours. Or they might think of adding an hour first to the 4 in 4:15, then adding 30 minutes to the 15 in 4:15.

5. **(turkey)** The first clue eliminates 7, and the second clue eliminates 1. The third clue eliminates 5, and the last eliminates 2, 4, and 6. Therefore by process of elimination, the student should arrive at 3. It will help if students are taught to cross out things that they know can't be true.

6. **(16, 36, 66, 76)** The pattern involves counting by tens, whereas problem 3 involves counting by fives. Students can work backwards until they find all of the numbers.

7. **(2 and 1/2)** The concept of sharing equally is an important one for work with fractions. In this problem, students have a chance to show that they understand intuitively both equal sharing and what one half means.

Commentary
Venus, XXV

1. **(1/2)** The problem is for students to pick the largest shaded area, disregarding the size of the denominator of the fractions shown. This is an intuitive introduction to smaller denominators representing larger unit fractions.

2. **(Pencil: 27¢; paste: 53¢; scissors: 93¢; ruler: 65¢)** Students have probably heard of adding tax to the cost of a purchase. If not, this would make an interesting introduction, including where some of the tax money goes.

3. **($3)** The problem is not difficult, if students know about dollars. In school, most of the concentration is on coins in the first grade, although there is no reason for students not to be introduced to dollars also. If so, the problem is essentially 5 − 2 = 3, ignoring the decimal points.

4. **(6)** This is an enjoyable problem for students. They might act it out, and keep a record of all the ways they can find. Organizing their work (e.g., using the smaller numbers in order in the first house) will help them be successful.

5. **(3)** Students can solve this problem easily by *guess-check-revise*. If so, they'll simply guess the starting number and revise as appropriate. Another approach is to try to reason logically, knowing that the missing number, when combined with 6 − 7, leaves 2.

6. **(black)** Students who do not have an intuitive sense of this probability problem would profit from an experiment with 6 objects that are identical, except for color, to 3 others objects. They can be placed in a paper bag, out of sight, and the experiment tried 20 times. The students should be convinced by such an investigation that black will come up more often.