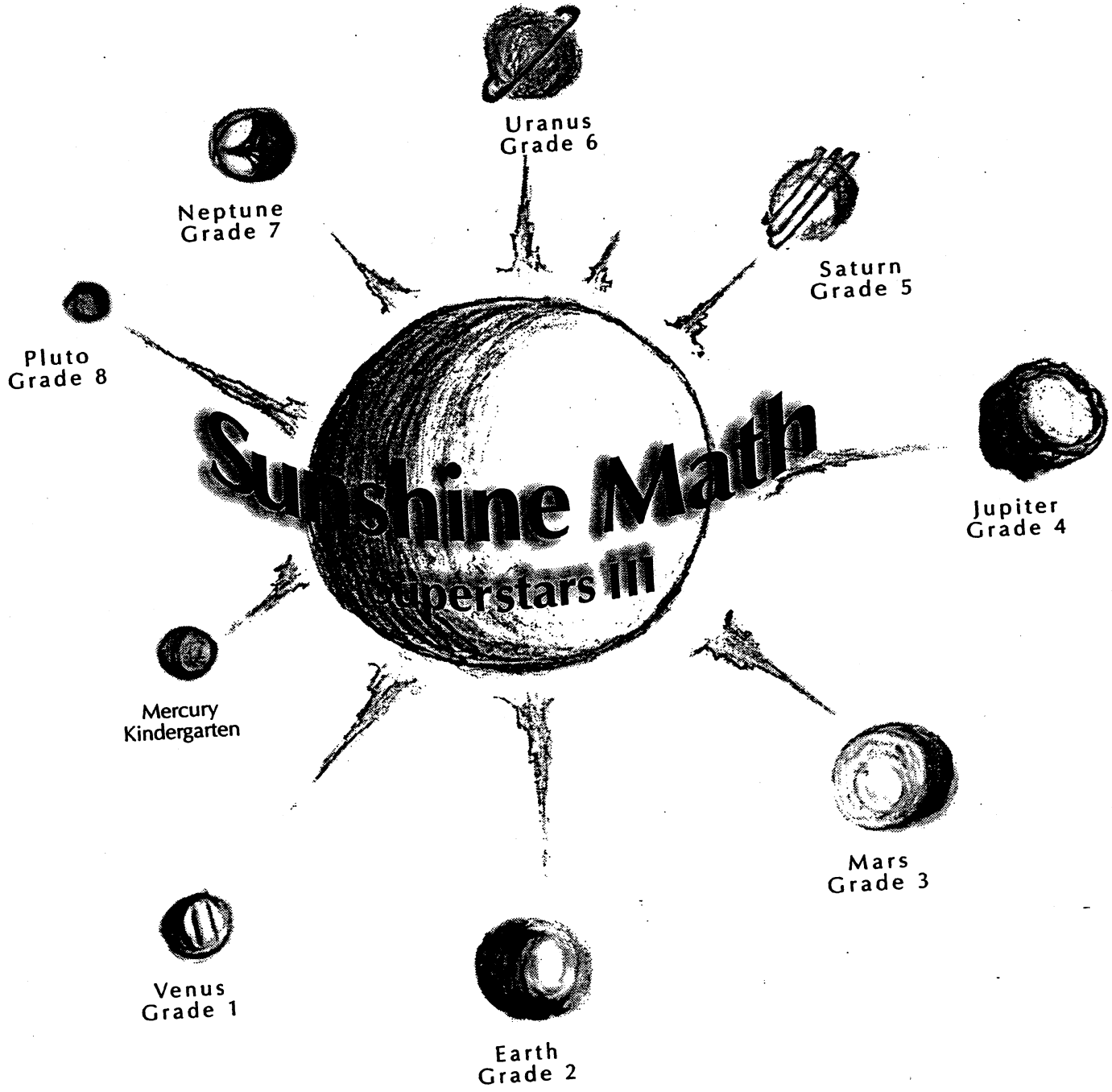


Jupiter
Grade 4

Acknowledgments

This project was conceived of and coordinated by the Florida Department of Education. In addition, it was supported financially through a grant to the School Board of Polk County. The rich history of these materials and the predecessor programs *Superstars* and *Superstars II*, goes back to the early 1980's. Dr. Andy Reeves initiated the program at the Department of Education, and many Florida teachers have been involved in developing and using these materials over the years.

The following Florida educators were primarily responsible for developing, field testing, and publishing *Sunshine Math*:

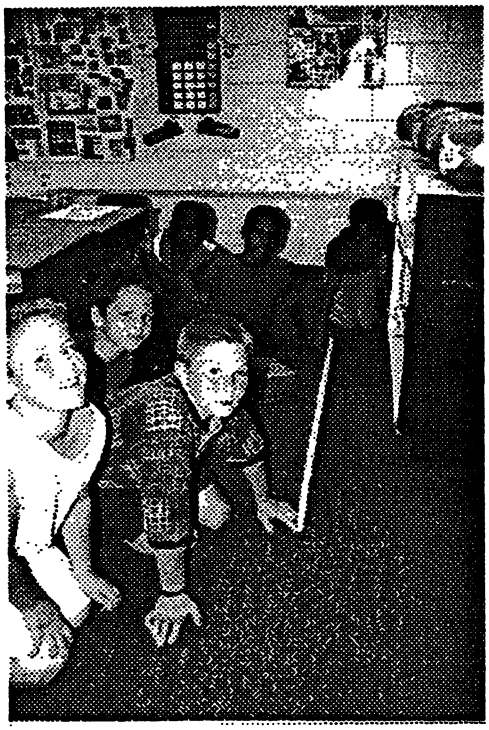
Jan Anderson	Cathy Foss	Lynda Penry
Jean Bartlett	Cheryl Gentry	Debbie Perry
Ricardo Bellon	Patricia Higginson	Jonathan Perry
Sandy Berger	Sherri Houp	Andy Reeves
Roy Bolduc	Sue Hunsinger	Mary Russick
Rosemarie Bolinder	Earlene Knight	Cathy Starling
Jacqueline Brown	Audrey Lanier	Patsy Shearer
Janie Cates	Carla Lowery	Lisa Tait
Marie Crittenden	Lynda Luckie	Mary Jane Tappen
Lawana Croskey	Colleen Malito	Linda Walker
Debbie Davis	Claudia Mittner	Jane Weese
Linda Ferriera	Carol Newman	Ken West
Mary Fletcher	Jill Nielson	Janet Williams
Carole Fordham	Roger O'Brien	Karol Yeats

Revisions were made to *Sunshine Math* by Sandy Berger, Frankie Mack and Linda Fisher with input from Andy Reeves and from volunteers and district staff in Broward, Duval, and Volusia school districts.

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.

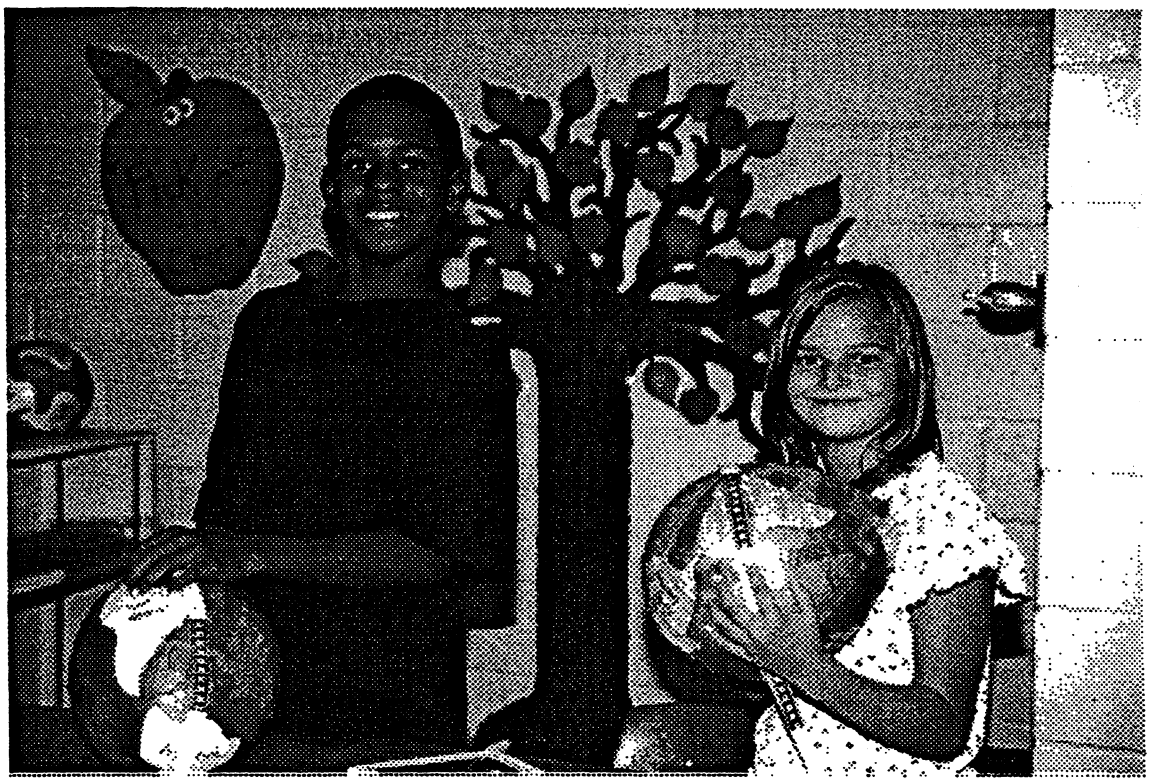
ORGANIZATION OF THESE MATERIALS

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

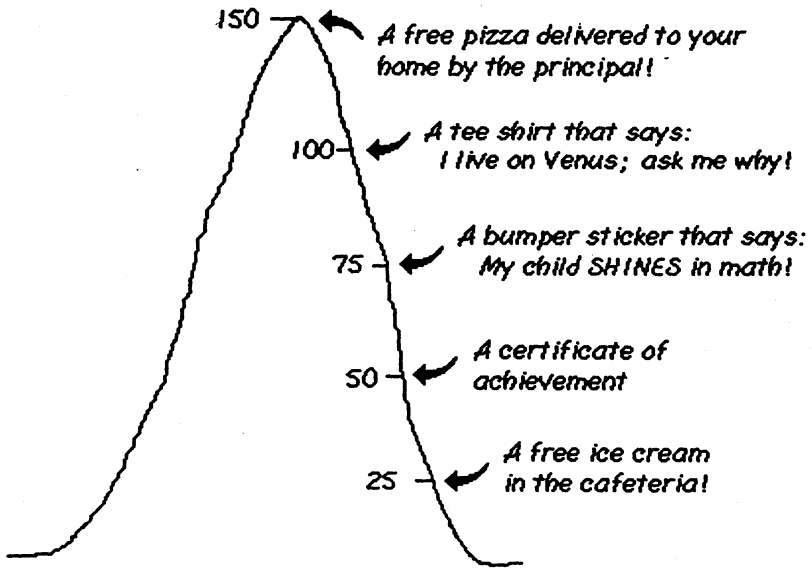
Sunshine Math is a K-8 enrichment package for mathematics, designed to be managed by volunteer assisting adults with coordinated support from the classroom teacher and school administrators. The purpose of the program is to give self-motivated students of all ability levels a chance to extend themselves 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.

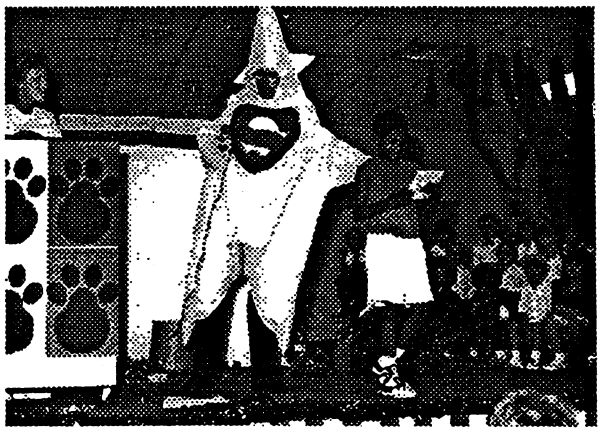
Sunshine Math is an optional program for students. It should be available to any student who wants to participate, regardless of prior success in mathematics. A large number of students will usually begin the program, but a majority of them will lose interest. However, a significant number of students 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:



Climb the Mountain this Year!!!

Join the Sunshine Math Club



Tom Walker, Principal at Bashaw Elementary School in Bradenton, passes out awards 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.

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!

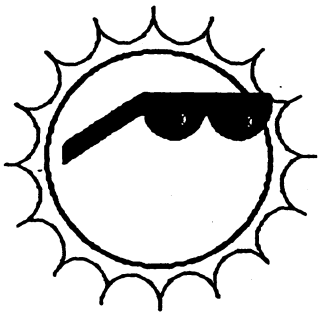
Checklist for assisting adults:

- ❑ 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)

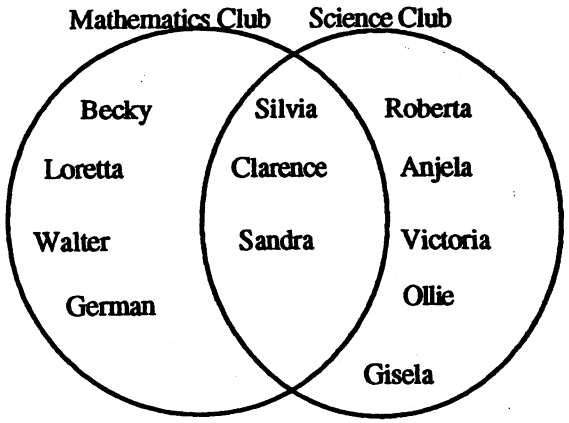
WORKSHEETS

SUNSHINE MATH - 4
Jupiter, I

Name: _____

(This shows my own thinking.)

★★★★ 1. The students in Mr. Renick's 4th grade class started a mathematics club and a science club. They drew a Venn diagram to show which students were in each club. Use the Venn diagram below to answer the questions about the clubs.



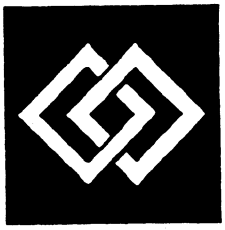
(a) How many students were in the mathematics club? _____

(b) How many students were in the science club? _____

(c) How many students were in both clubs? _____

(d) If one-half of Mr. Renick's class is in either the math club or the science club or both clubs, what is the total number of students in Mr. Renick's class? _____

★★ 2. How many right angles are in this picture of intersecting square frames, including the background?



Answer:_____ right angles

★ 3. If the 7th day of a month is on Friday, on what day is the 24th day of the same month?

Answer: _____

★★★★ 4. Think about the following list of number pairs. Three is the first number of a pair, and 8 is the second.

3 → 8
4 → 11
5 → 14
6 → 17
. .
. .
. .
10 → 29
. .
. .
. .

a. If 50 is the first number, what is the second number? ____

b. If 200 is the first number, what is the second number? ____

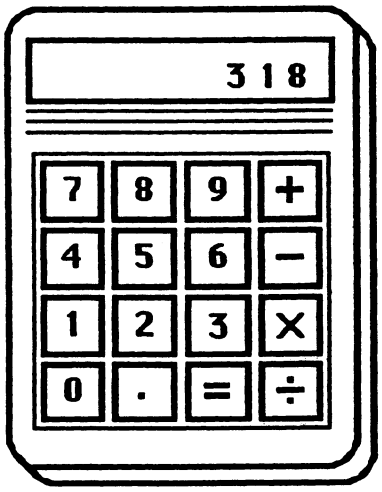
c. If 89 is the second number, what is the first number? ____

d. If a number *n* is the first number, what is the second number? _____

★★ 5. The sum of two whole numbers is 72. Their difference is 48. What are the two numbers?

Answer: _____ and _____

★ 6. Henry was at the store, and used his calculator to add up the price for 2 loaves of bread. He got the number shown in the display, but didn't know exactly how much money that was. How much money would those two loaves cost? Circle the correct answer below.



a. $318

b. 3.18¢

c. $318.00

d. $3.18

★★ 7. In your class, 9 students received an "excellent" on a recent project. Your teacher would like to buy pencils for those 9 students. The school store sells them for 10 cents each or 3 for 25 cents. What is the least amount of money your teacher will have to spend in order to buy one pencil for each of the 9 students?

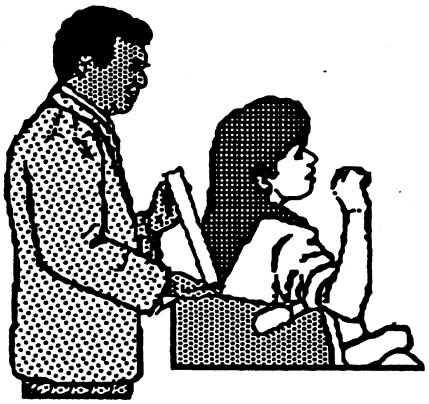
Answer: _____cents

SUNSHINE MATH - 4
Jupiter, II

Name: _____

(This shows my own thinking.)

★★ 1. Hair grows about $\frac{1}{2}$ inch each month. After you shave your head, how many years will it be until your hair is 1 foot in length?



Answer: _____ years

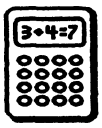
★★ 2. Robert received a weekly allowance of $6 on Monday. He put 50% of his money in his empty piggy back, but then took out 50% of that money to go to a movie. How much money was left in the piggy bank?

Answer: $_____

★ 3. An arcade video game had a code built in. In order to play the game Tamika had to find the missing numbers. Help her by filling in the pattern below.

113, _____, 95, 86, 77, _____, 59, _____, 41, 32, 23, 14, 5.

★★★ 4. Sabrina used a calculator and started adding the whole numbers in order:



1 + 2 + 3 + 4 + 5 + ...

What is the last number she would add that would get the sum on her calculator over 1,000?

Answer:_____

★★ 5. Marcus, Aaron, and Jason went to a double feature movie. The show began at 1:45 pm and lasted for 4 hours and 27 minutes. At what time did the show end?

Answer:_____

★ 6. Maria, Colleen, Patsy, and Kenyada are 8, 9, 10, and 11 years old.

Maria is older than Patsy and younger than Kenyada.

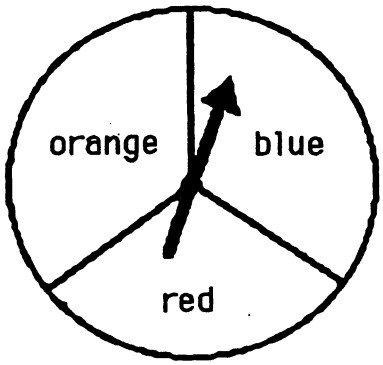
Colleen is younger than Marie and older than Patsy.

What is each girl's age?

Answers: Maria: _____ years old. Patsy: _____ years old

Colleen: _____ years old Kenyada: ____ years old

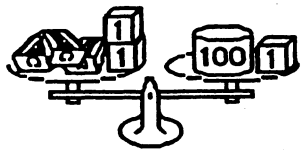
★★★★ 7. On a game board, landing on blue means to move ahead 1 space, landing on red means to move ahead 2 spaces, and landing on orange means to move back 1 space. If you took 30 spins, about where would you expect to be on the game board, relative to where you started?



Answer: I would be about ____ spaces _____.
(ahead or behind)

★★★ 8. Margarit liked to balance things. She balanced 3 pencil sharpeners and 2 one-gram blocks with a 100-gram weight and another one-gram block. She let x stand for the weight of one pencil sharpener, and she claimed that $x = 30$ grams. Was she correct? If not, how much did each pencil sharpener weigh?

Answer: _____



SUNSHINE MATH - 4
Jupiter, III

Name: _____

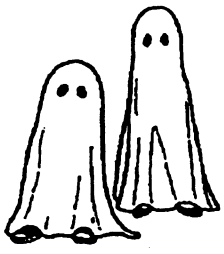
(This shows my own thinking.)

★★ 1. After filling in the multiplication table below, Parker noticed some number patterns. Fill in the chart and follow the directions beneath it.

×	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Draw a circle around the line of numbers that has only *square numbers* in it.

★★★ 2. Mr. Jackson is preparing bags of treats to give trick or treaters on Halloween. He has 48 pieces of candy and 60 pieces of gum. He uses all the candy and gum, and he puts the same ratio of candy to gum in each bag. What is the largest number of bags he could have made?



Answer:_____

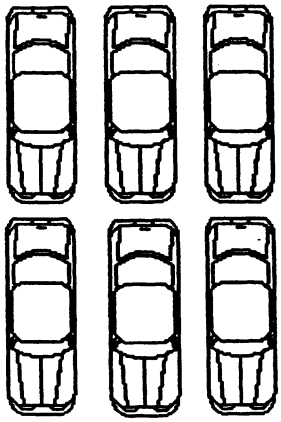
★ 3. It is now 10:45. What time will it be in 2 hours and 15 minutes?

Answer: _____

★★ 4. Six cars are parked in front of a local car dealers lot.
You are looking at the cars from the front.

•The red car is parked in front of the green car.
•The black car is between the green car and yellow car.
•The blue car is parked on the right side of the red car.
•The orange car is parked in front of the yellow car.

Color the cars to show how they are parked, or write the name of the color on each car.



★ 5. Susan made $15.00 baby-sitting. She spent $11.15 on a birthday present, including tax. To the nearest dollar, how much does she have left ?

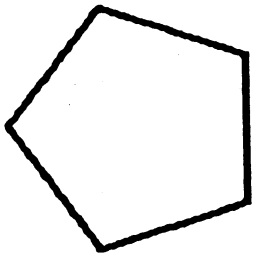
Answer: _____

★★★★ 6. The Disney Golf Classic starts with 64 golfers. The golfers form pairs and each pair plays a match. The losers drop out and the winners of each pair then form new pairs and play again. Then those winners form pairs and play. This continues until there is one winner.

a. In how many matches must the winner play? _____

b. How many matches are played by all the golfers, to determine the winner? _____

★★★ 7. Draw all the lines of symmetry for this polygon.



★★★ 8. A number has 4 digits.
No digits in the number are repeated.
The digit in the tens place is three times the digit in the thousands place.
The number is odd.
The sum of the digits in the number is 27.

What is the number? Answer: _____

SUNSHINE MATH - 4
Jupiter, IV

Name: _____

(This shows my own thinking.)

★★ 1. A school bus makes 7 stops on its trip to school and 7 stops on the trip home.

a. How many stops will the bus make in one full week of school? _____

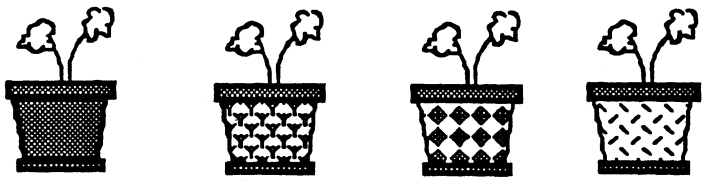
b. How many stops will the bus make in the 180-day school year? _____

★ 2. When Michelle woke up yesterday, the temperature was 72° F. By lunch time, the temperature had risen 15° F. By dinner time, it had fallen 22° F. What was the temperature at dinner time?

Answer: _____ ° F

★★★ 3. Teresa has 4 flower pots in 4 different designs. She likes to display her flower pots in different positions on her window sill. How many different ways can she place her flower pots?

Answer:_____ways



★★ 4. What is the mystery number x?

- x has 3 digits.
- The tens digit is half the hundreds digits.
- The number is odd.
- The sum of the digits is 9.

Answer: $x =$ _____

★ 5. If the 7th day of the month is on a Tuesday, on what day is the 25th?

Answer:_____

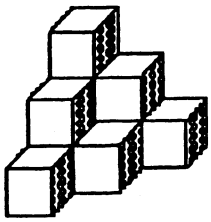
★★★ 6. On the average your heart beats about 72 times per minute. At this rate, about how many times will it beat:

a. in a 30-day month? _____

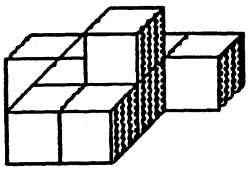
b. in a year? _____

c. in your lifetime, if you live to 72 years of age? _____ .

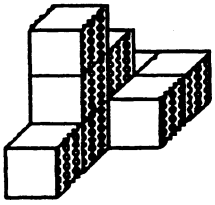
★★★ 7. The volume of a shape is the number of cubes it will take, all the same size, to make the figure. Each figure is made of stacks of cubes that are 1 centimeter on each side. Find the volume of the figures below.



a.



b.

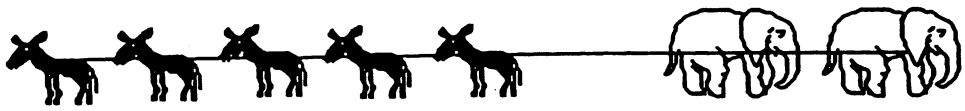


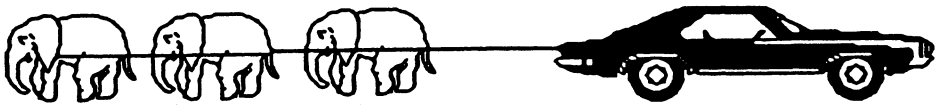
c.

Answer: a._____ cm^3 Answer: b_____ cm^3 Answer: c_____ cm^3

★★★ 8. In a tug of war, 5 donkeys are exactly equal to 2 elephants. In another tug of war, 3 elephants are equal to 1 car. Which team should win if a car and 3 donkeys are matched against 4 elephants?

Answer: _____





SUNSHINE MATH - 4
Jupiter, V

Name: _____

(This shows my own thinking.)

★★★★ 1. A normal person blinks about 25 times per minute when awake.

a. How old will you be on your next birthday?

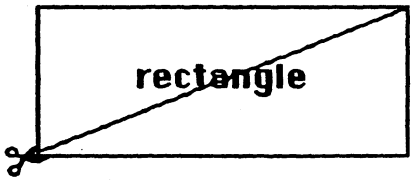
b. To the nearest million, how many times will you have blinked on your next birthday? Assume you sleep 8 hours each day.

Answers: (a) _____ (b) _____

★★ 2. Pablo has $3.15 in dimes and quarters. He has more quarters than dimes. How many quarters and dimes does he have?

Answer: _____ quarters and _____ dimes

★★★★ 3. Use a centimeter ruler and a separate sheet of paper to draw an 8 cm. by 6 cm. rectangle. List its perimeter on the table below. Then cut out the rectangle and also cut along the diagonal as shown in the picture below. Use your two pieces to create 4 new geometric shapes. After making each shape, determine its perimeter. Below list the names of the shapes made and their perimeters.



SHAPE	PERIMETER
rectangle	____
_____	____
_____	____
_____	____
_____	____

★ 4. Fill in the missing digits:

$$\begin{array}{r} 4\,\square\,6\,8 \\ 5\,\square\,6 \\ +\ \square\,9\,4\,\square \\ \hline 1\,1,1\,1\,1 \end{array}$$

★ 5. *Century* is to *decade* as *dollar* is to: (a) penny (b) nickel (c) dime (d) quarter

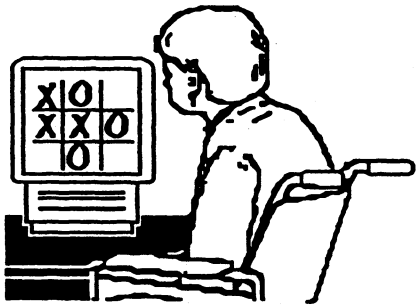
Answer: _____

★★ 6. Roberto ate 3 pieces of a pizza and then felt that he should pay $\frac{1}{4}$ of the cost because that's the fraction he ate. How many pieces was the pizza cut into?

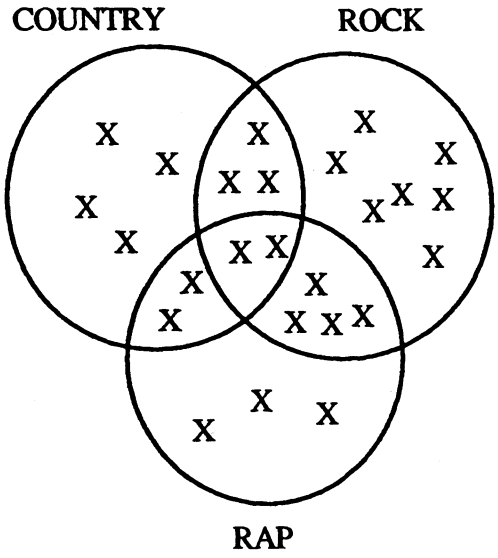
Answer: _____ pieces

★★★ 7. Thomas is playing tic-tac-toe with a computer. It is the computer's turn to place an "X" on the board. If the computer makes its moves at random in the open spaces, what is the chance it will win on this move?

Answer: _____



★★★★ 8. Answer the questions below using the Venn Diagram showing Ms. Berger's students musical preferences.



CLASS CENSUS

How many students took part in the all class census?

_____

How many students prefer only rap?

_____

How many students prefer only rock and country?

_____

How many students prefer rap or country but not rock?

_____

SUNSHINE MATH - 4
Jupiter, VI

Name: _____

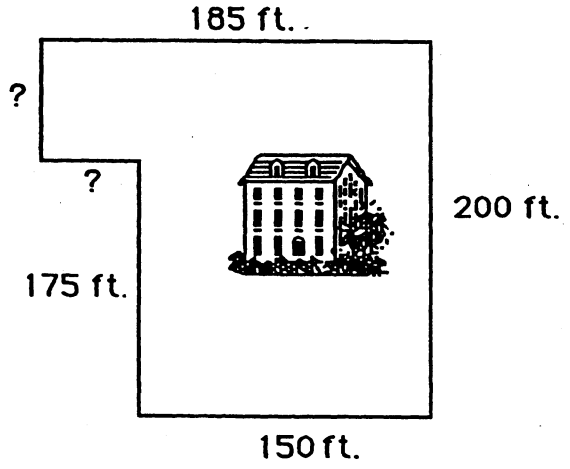
(This shows my own thinking.)

★★ 1. Jean went on a vacation with her parents in their family car. They left their home in Florida on Monday at 7:15 a.m. and arrived in North Carolina on Tuesday at 11:45 a.m. How long was their trip?

Answer: _____ hours and _____ minutes

★★★ 2. Mr. Brown wanted to put up a fence around his property. How many feet of fencing did he need? The lawn is outlined to the right, but the picture is not drawn to scale.

Answer: _____ feet



★★★ 3. Find the next number in the patterns below.

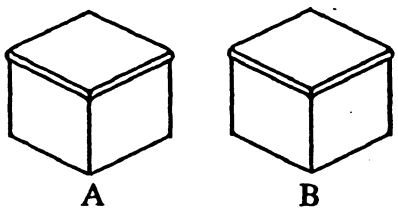
(a.) $32.10 → $32.30 → $32.50 → $32.70 → $32.90 → $_____

(b.) 720 → 360 → 180 → 90 → ____

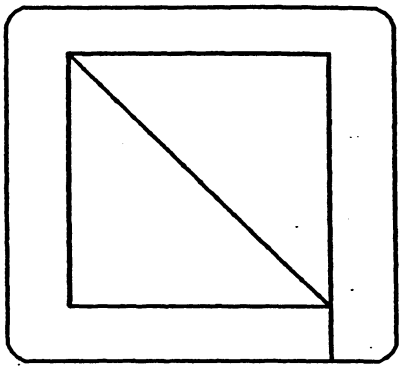
(c.) $\frac{1}{2} \rightarrow \frac{1}{4} \rightarrow \frac{1}{8} \rightarrow \frac{1}{16} \rightarrow$ _____

★★★★ 4. Box A has 3 red marbles and 2 yellow marbles. Box B has 2 red marbles and 1 yellow marble. If you have to pick a red marble to win a prize and you can not look in the box, which box would give you the best chance of winning the prize?

Answer: _____



★★ 5. You can trace over this figure with a pencil without retracing any path, if you start in the right place. Find the two places where you can do this, and draw circles around them.



★ 6. If 5 is added to a number n and the answer is multiplied by 2, the result will be 24. What is the number n?

Answer: $n =$ _____

★★★ 7. Estimate the answers below. Circle the best choice.

a. $3\frac{10}{11} + 2\frac{1}{101}$ Choose: 4 or 5 or 6 or 7

b. $5\frac{2}{47} - 2\frac{1}{35}$ Choose: 2 or 3 or 4 or 5

c. $6\frac{17}{19} \times 7\frac{3}{290}$ Choose: 42 or 49 or 63 or 213

★★★ 8. You need $\frac{1}{2}$ cup of sugar to make a three-layer cake. How much sugar would you need for a one-layer cake?

Answer: _____

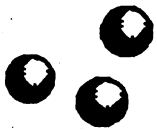
★ 9. What is the product of the ten one-digit numbers? Answer: _____

SUNSHINE MATH - 4
Jupiter, VII

Name: _____

(This shows my own thinking.)

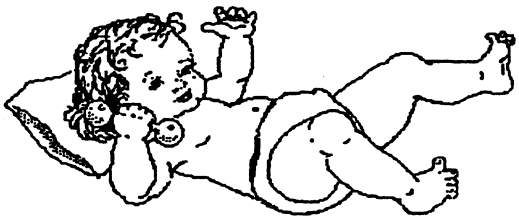
★★★★ 1. One green, one red, and one blue marble are placed in a bag. The days of the week are written on seven pieces of paper and put in another bag. You can draw from either bag for a $1 million prize. To win, you must either draw a weekend day -- Saturday or Sunday -- or a blue marble. Which bag gives you the best chance of winning, the marble bag or the day-of-the-week bag?



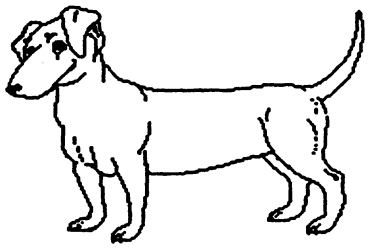
Answer: _____

★ 2. One disposable diaper will stay in a landfill, without decomposing, for 2000 years. If you put 4 disposable diapers into a landfill tomorrow, how long will it be before they are all decomposed?

Answer: _____ years



★★★ 3. Faye has 20 feet of fencing to make a rectangular pen for her dog. What is the largest area that she can fence in?

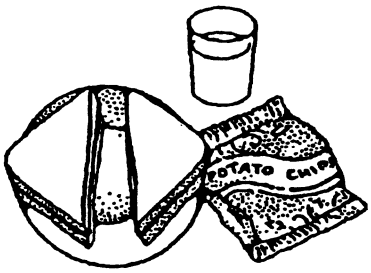


Answer: _____ square feet

★★ 4. Herman's lunch came to $4.27, and he gave the clerk $5.02. Why did he give the clerk two extra pennies?

Answer: _____

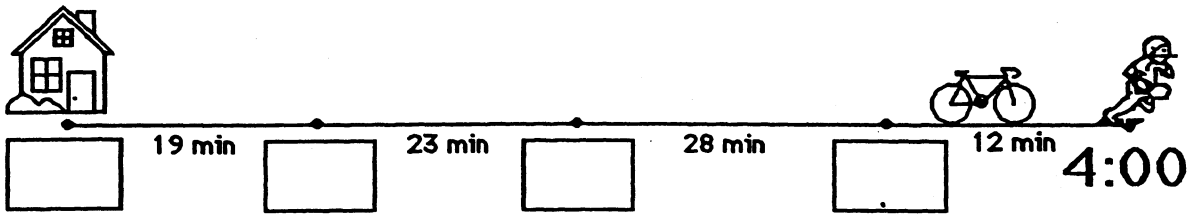
_____



★★★ 5. Juan's age is 3 times Derrick's age, and Tyrone is twice as old as Derrick. The sum of their ages is 30. How old is each boy?

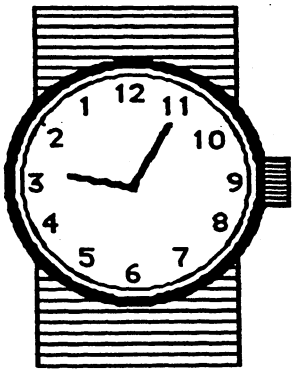
Answers: Juan is _____; Derrick is _____; Tyrone is _____

★★ 6. Maurice and his 3 friends ride their bikes to football practice each afternoon after school. Maurice leaves his house and goes to each friend's house, and they travel on together. He has timed each part of the trip. Practice starts at 4:00 sharp. Write in each box below when Maurice should arrive, so they won't be late for practice. Also write in the time he should leave his own house.



★★ 7. This watch is unusual -- it runs *counterclockwise*. What time will it be 4 hours and 45 minutes from the time shown?

For your answer, draw the hour and minute hands where they should be on this watch.



★★ 8. An adult has about 5 quarts of blood. When they donate a pint for a sick friend, what fraction of their blood do they give away?

Answer: _____

★★ 9. The human body is about 70% water, by weight.

a. How many pounds do you weigh? _____ pounds

b. How many pounds of you is water? _____ pounds

SUNSHINE MATH - 4
Jupiter, VIII

Name: _____

(This shows my own thinking.)

★★ 1. What number is as much greater than 36 as it is less than 94?

Answer:_____

★★★ 2. Find a pair of numbers for each sum and product. Write your answers in the blanks.

	Numbers	Sum	Product
Example →	5 , 3	8	15
	___ , ___	10	24
	___ , ___	12	20
	___ , ___	14	48
	___ , ___	16	63
	___ , ___	18	45
	___ , ___	31	30

★★★ 3. Ashley, Jonathan, Sarah, Carlos, and Tanya all made the finals of the National Math Fair Competition last year. Before the final round began, each one had to shake hands with all the others. How many handshakes were there?

Answer: _____ handshakes

★★ 4. Karen's first five grades are: 92, 88, 99, 97, and 89. If she has an average of 94, she'll get an A on her report card. Find Karen's average. Will Karen get an A or a B?

Answer: Karen will get a(n) _____.

★ 5. Find the missing digits. Write the completed problem below to the right.

$$\begin{array}{r} 5\square,682 \\ -\ 43,8\square6 \\ \hline 6,786 \end{array}$$

Answer:

★ 6. On the Fourth of July, a typical temperature in Florida during the day would be:

a. 12^{o} C b. 120^{o} F c. 36^{o} C

Answer:_____

★★ 7. Rachel mailed out 12 party invitations and the stamps cost $0.32 each. She paid for her stamps with a five dollar bill. How much change should she receive?

Answer: _____

★★★★ 8. In these addends, each letter represents a single digit. Find the numbers. Write the completed problem below, on the right hand side.

$$\begin{array}{r} CENT \\ CENT \\ +\ SCENT \\ \hline 35128 \end{array}$$

Answer:

★★ 9. To change "dog years" to "people years," you multiply the dog's age by 7.

a. How old, in people years, is a 10-year old dog? _____

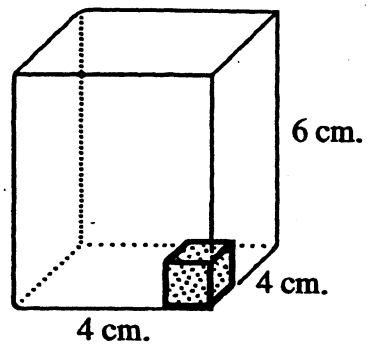
b. How old are you? _____ How old a dog is equal to you in age? _____

SUNSHINE MATH - 4
Jupiter, IX

Name: _____

(This shows my own thinking.)

★★ 1. The *volume* of a box is the number of cubes it would take to fill it up. If each cube is a centimeter on the edges, the volume would be given in *cubic centimeters*. What is the volume of the 4 cm x 4 cm x 6 cm box to the right?



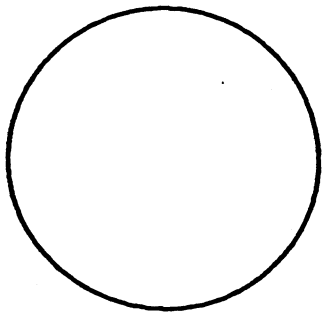
Answer: _____ cubic centimeters

★★★ 2. Mario got his $10.00 weekly allowance on Monday. He spent 25% of his weekly allowance on Tuesday, 15% of his weekly allowance on Wednesday, and 10% more on Thursday. How much money did he have left to spend for the rest of the week?

Answer: _____

★★ 3. Shade in $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{1}{2}$ of the circle. What fraction of the circle is shaded?

Answer: _____ is shaded



★★★★ 4. How many outfit combinations are possible with 1 pair of sneakers, 3 tee-shirts and 2 pairs of jeans? Drawing a diagram might help to illustrate your strategy.

DIAGRAM:

Answer: _____ outfits are possible

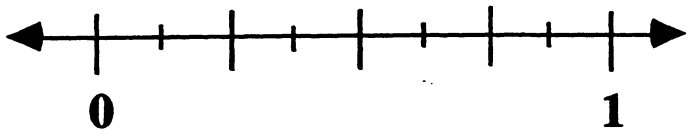
★★★ 5. Sonya has x amount of money. Bob has three times as much as Sonya has, less $14.62. Write an expression, using x, that tells how much does Bob has.

Answer: $ _____

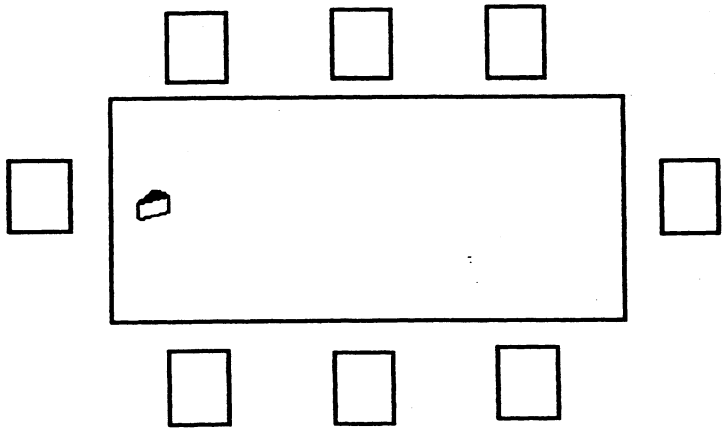
★ 6. Mr. Harmen graded 56 papers Monday and 87 papers Wednesday. How many papers did Mr. Harmen grade in the two days?

Answer: _____

★ 7. Place the letter X on the number line where $\frac{5}{8}$ would be.



★★ 8. Use logic and the clues given to find out who will be sitting in what chair at the Halloween party. Fill each chair with the character's initial.



CLUES

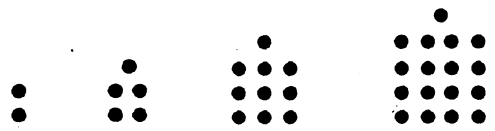
The Jack-o-lantern sits on the Ghost's immediate right.
Sleeping Beauty sits across from the Prince.
The Witch is to the right of Sleeping Beauty.
The Prince sits between the Jack-o-lantern and the Fireman.
The Ghost sits at the head of the table with the wedge of cheese.
The Clown sits to the left of the Robot.

SUNSHINE MATH - 4
Jupiter, X

Name: _____

(This shows my own thinking.)

★★ 1. Draw the fifth and sixth figures to follow the pattern of dots below.



1 2 3 4 5 6 .....

★★★ 2. Answer these questions about the pattern in problem 1 above.

a. How many dots would it take to make the 10th figure in the pattern? _____

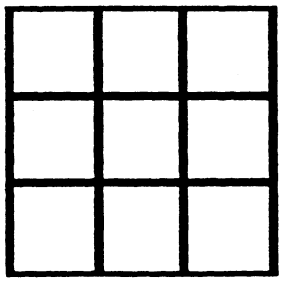
b. What is the number of the figure that is made with 401 dots? _____

c. Let *n* stand for any figure number. Use *n* to tell how many dots there would be in the *nth* figure. _____

★★ 3. Margo's dog had a litter of 7 pups, all alike except for coloring. The mother and one pup weighed 15 pounds. The mother and two pups weighed 17 pounds. How much did the litter of 7 pups weigh by themselves?

Answer: _____ pounds

★★★★ 4. In a Magic Square, the sums of the columns, rows and diagonals are all the same. Using the digits 1-9 only once, fill in the blanks to make this figure a magic square with a sum of 15.



★ 5. Back in the old days, couples would enter marathon dance contests to win money. They would dance continuously, with only short breaks for food and drink. Some contests would go on for over a week. How many hours of dancing would there be in a 7-day week?

Answer: _____ hours

★★★ 6. Mr. Trumpet would like to offer you a job. He will hire you for ten days. He will pay you one of three ways:

a. $1.00 the first day, $2.00 the second day, $3.00 the third day and so on.

b. 10¢ the first day, 20¢ the second day, 40¢ the third day, and each day twice the amount of the day before.

c. $6.00 each day for all ten days.

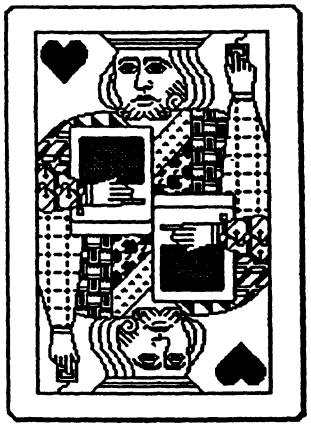
Which way would pay you the most money? Answer:_____

★ 7. How many gallon jugs would you need to hold 3 and $\frac{3}{4}$ gallons of lemonade?

Answer:_____jugs

★★★★ 8. Your Mom is a sporting person, so when it's close to your bedtime, she will have a contest with you to see if you get to stay up an extra half-hour to play a computer game. You get to draw a card from a well-shuffled deck. If you draw a face card, an ace, or any heart, she'll "have a heart" and let you stay up. If you draw any other card, you lose and go ahead to bed. Who has the best chance of winning, you or your Mom?

Answer: _____



SUNSHINE MATH - 4
Jupiter, XI

Name: _____

(This shows my own thinking.)

★★ 1. The corner of this paper measures 90 degrees. Fold the lower right-hand corner of this paper so it represents two 45 degree angles. Trace the fold line with your pencil.

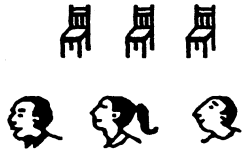
★★ 2. Estimate the result of the following problem as a whole number.

$$4\frac{1}{43} + 2\frac{15}{16} - 1\frac{24}{26} + 5\frac{11}{12} - 3\frac{3}{61}$$

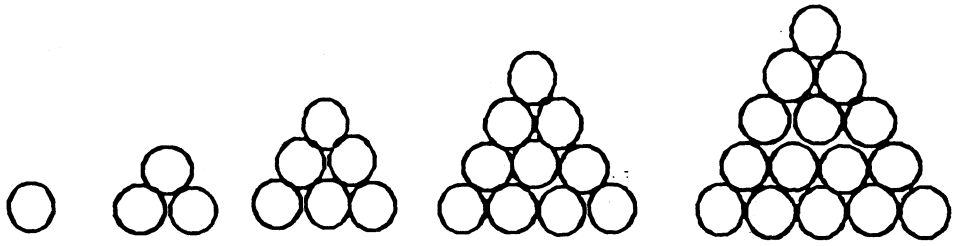
Answer: _____

★★★ 3. How many ways can 3 students be arranged in three chairs?

Answer: _____ ways



★★ 4. Observe the circles in the triangle-shaped stacks. Fill in the missing numbers to show how many circles are in the last two stacks.



1 3 6 ___ ___

★★ 5. Draw the next figure in the above pattern.

★★★ 6. In the pattern for problem 4, how many circles would be in the 10th figure?

Answer:_____

★★★ 7. The Florida Lottery is made up of the numbers 1 - 49. My mother has observed that the winning numbers many times are prime numbers.

a. List the prime numbers from 1 - 49: _____

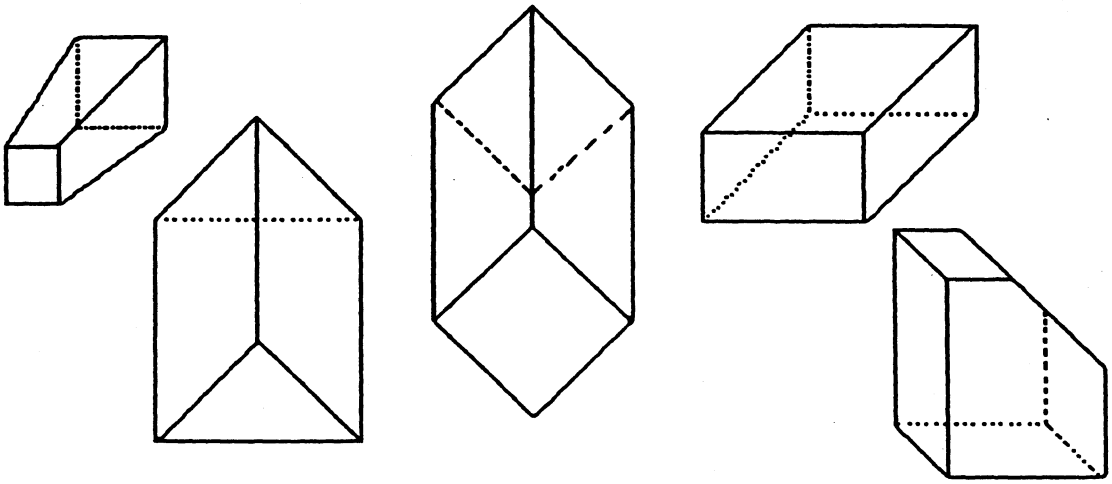
b. What is the probability of a prime number being picked randomly from the numbers 1 - 49? _____

c. Is the probability of picking a prime number greater than picking a number that is not prime? _____

★★★ 8. Put <, >, or = in each blank below, to give true statements.

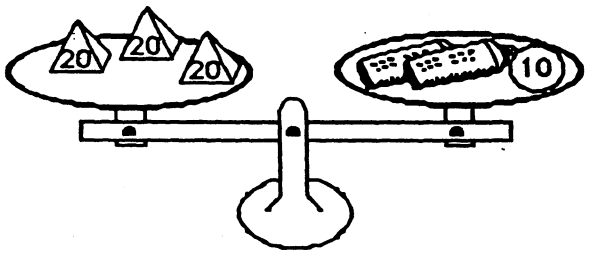
(a) 3030 _____ 3300 (b) (345 + 253) _____ 600 (c) 1.09 _____ 1.090

★★★ 9. Circle the following solid figures that have at least one square face.



★★ 10. Lu Win likes to balance things. She balanced three 20-gram weights with a 10-gram weight and two new tubes of glue. How much did each tube of glue weigh?

Answer: _____ grams



SUNSHINE MATH - 4
Jupiter, XII

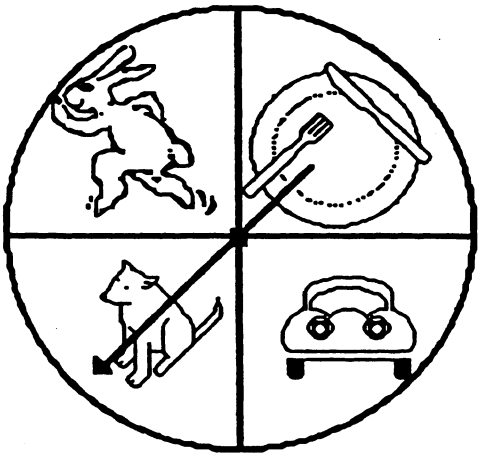
Name: _____

(This shows my own thinking.)

★★★ 1. A snail climbs up a wall 20 feet high. Each day the snail climbs 5 feet, but each night it slips backwards 4 feet. How many days will it take for the snail to get to the top of the wall?

Answer:_____days

★★ 2. Raoul got to spin this spinner, to see what chore he had to do Saturday mornings. He could wash the dishes, wash the car, wash the dog, or change the paper in the rabbit cage. What is the chance he will have to wash something Saturday morning, as a fraction and as a percent?



Answers: fraction: _____

percent: _____

★ 3. A costume shop had a special sale. Bob got his clown costume for $\frac{1}{2}$ off the marked price of $25. How much did the costume cost?

Answer: _____

★ 4. If today was October 11th, how many days would be left in the current year?

Answer:_____days

★★★ 5. **What Number Am I ?**

I am a three-digit number.
I am less than 200.
I am divisible by 12, and by 9.
My units digit is less than my tens digit.

Answer: _____

★★★ 6. Suppose that humans walk about 10,000 steps per day, on average.

a. Your average step is probably about 18 inches.
If so, how many ***inches*** per day do you walk?_____

b. How many ***feet*** per day do you walk? _____

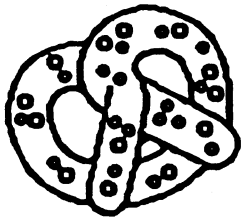
c. How many ***miles*** per day do you walk, to the nearest whole mile? _____

★★ 7. If you tend to be one of those people who taps their foot, picks their nails, drums their fingers, or moves around in their seat, there may be some good news. Although your fidgeting may be annoying to others, researchers at the National Institute of Health reports that one of these habits can burn as much as 800 calories per day. If you want to lose weight, this might help.

For someone who fidgets as above, how many calories per hour are burned up? Assume the person sleeps 8 hours per day, and doesn't fidget while asleep.

Answer: _____

★★★ 8. It costs Mr Kringle $10 to make 100 giant pretzels for his bakery. If he sells his pretzels for 25¢ each, how much profit will he make after selling all 100 pretzels?



Answer: $_____ profit

SUNSHINE MATH - 4
Jupiter, XIII

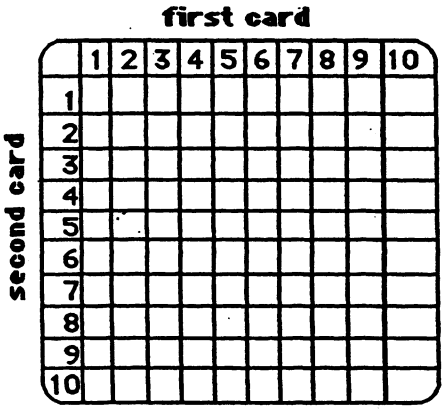
Name: _____

(This shows my own thinking.)

★★★★ 1. To win $1 million, you must draw two cards whose sum is nine, from a stack of cards numbered 1 through 10. After the first draw, you replace the card and shuffle the stack again for the second draw. What is the chance that your two cards will have a sum of nine?

Use the chart if it helps you think about the possibilities.

Answer: _____

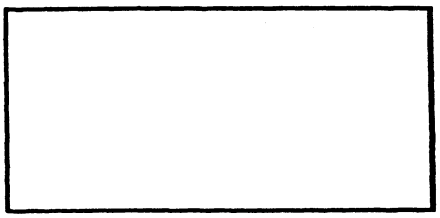


★ 2. Joey agreed to help his mom with the summer chores for $1.50 a day for 20 days. Susan agreed to water the neighbor's indoor plants and feed the cat while they were on summer vacation for $5.00 a week for 5 weeks. Who made more money over their summer vacation,

Joey or Susan?

Answer: _____

★★ 3. It's time to plant a spring vegetable garden. $\frac{1}{3}$ will be root plants, $\frac{1}{3}$ will be stalk plants, and $\frac{1}{3}$ will be vine plants. $\frac{1}{2}$ of the stalk and vine plants will be grown organically without fertilizer. What fraction of the garden will be grown organically? Fill in the rectangle to show how the garden can be set up.



Answer: ____ will be grown organically.

★ 4. Juanita has 35 pre-addressed post cards she plans to hand out to her friends so they will write to her while she is away visiting her grandmother. She has 7 friends she'd like to give them to. Write a number sentence to show how Juanita can share her cards equally among her friends.

Answer: _____

★★ 5. Mary Jane called UPS to find a cost estimate for shipping her racing bicycle from Florida to her sister's house in Vermont.

a. The first information requested by the UPS agent was for the dimensions of the bike. Circle the most reasonable answer.

(a) 14 inches by 6 inches (b) 14 feet by 6 feet

(c) 5 feet by 4 feet (d) 5 yards by 3 yards

b. The second question the agent asked was the approximate weight of the racing bike. Circle the most reasonable answer.

(a) 300 grams (b) 15 kilograms (c) 1 metric ton (d) 225 kilograms

★★★ 6. Felicia collected data from her classmates using a tally sheet. She asked each student what types of electronic appliances they had at home. Below is the data Felicia collected and recorded on a pictograph. Answer the questions related to the graph.

(a) How many different types of appliances are listed? _____

(b) What is the total number of all electronic appliances listed? _____

(c) According to the data collected, what are the three most popular electronic appliances?

Answer: _____, _____, _____

ELECTRONIC APPLIANCES AT HOME

ITEM	NUMBER FOUND
Hairdryer	💡💡💡
Television	💡💡💡💡
Washing Machine	💡💡💡
Computer	💡
Food Processor	💡
Clock Radio	💡💡
Stereo	💡💡💡
Walkman	💡💡💡💡
Lamps	💡💡💡💡💡

💡 = 4 APPLIANCES

★★ 7. Write in the three missing numbers in the pattern.

....., _____, _____, 171, 162, 153, 144, 135, 126, _____, ...

SUNSHINE MATH - 4
Jupiter, XIV

Name: _____

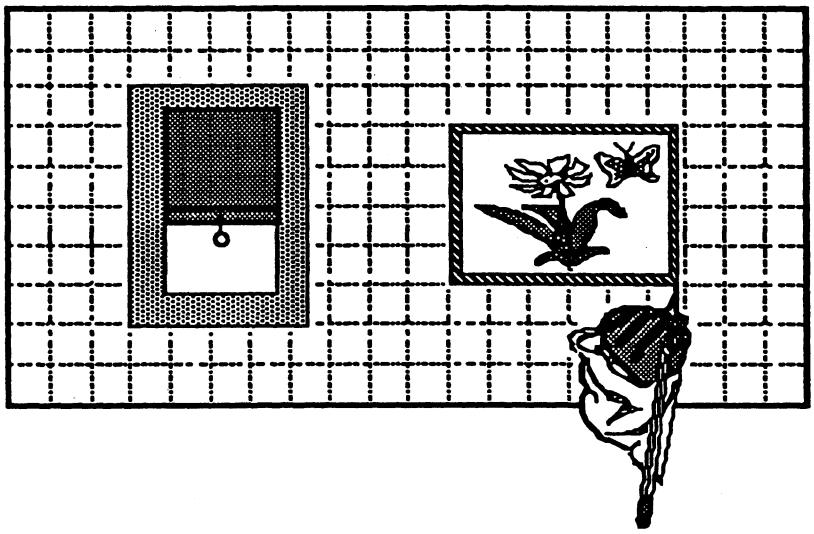
(This shows my own thinking.)

★★ 1. Charles likes to draw and thinks he will become an architect one day. He is always concerned about the size of the objects he draws. Charles said the areas of the window and picture below were about 27 square units and $23\frac{1}{5}$ square units, respectively. Was he correct? Why or why not?

Answer: _____

_____

_____



★★★ 2. Farmer Brown had some animals. One-fourth were horses, one-half were cows, and the rest were pigs. He had 8 pigs. How many animals did he have altogether?

Answer: _____

★★★ 3. To change a Fahrenheit temperature to a Celsius temperature, follow these steps:

- *Subtract 32 from the Fahrenheit temperature.*
- *Divide by 9.*
- *Multiply by 5.*

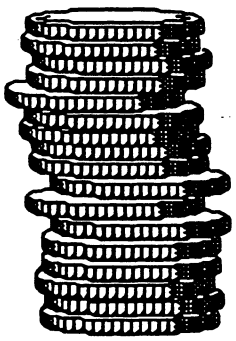
Use the steps to write the Celsius temperature for each of these Fahrenheit readings:

a. 59°F is _____ °C b. 86°F is _____ °C c. 122°F is _____ °C

★★ 4. Marilyn used the steps above, and got a Celsius temperature of 60°. What was the Fahrenheit temperature she started with? _____

★ 5. How much is this stack of quarters worth?

Answer: _____



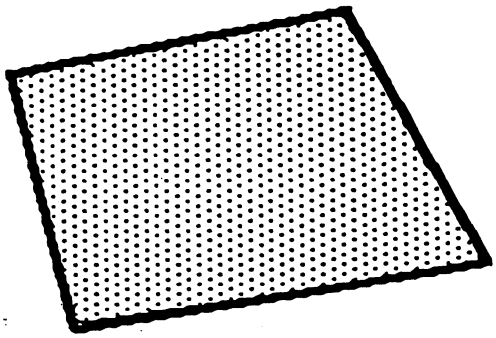
★★ 6. The Adams family wants to take a trip to Disneyworld, but can't decide what month to go. They decide to write the names of the months on 12 pieces of paper and put them in a hat. They will draw one piece of paper without looking -- that is the month they will travel.

a. What is the chance they will go during the summer months of June, July or August? _____

b. What is the chance they will go during the school year, September through May? ____

★★ 7. Shown to the right is the way 1 square inch of a newspaper would look, when enlarged so you can see the tiny dots. About how many dots are there per square inch, in a newspaper? Circle the best choice.

a. 100 b. 500 c. 1000 d. 1500



★★★★ 8. Consider each of the following. Can the equation 6 x 3 + 4 = 22 represent any of these statements? Circle "yes" or "no" beside each statement below.

yes *no* a. Six tickets at $3 each plus a $4 ticket costs $22.

yes *no* b. Six $3 lunches and a $4 tip come to $22.

yes *no* c. A bike trip of 6 miles in 3 weeks, and 4 more weeks, is 22 miles.

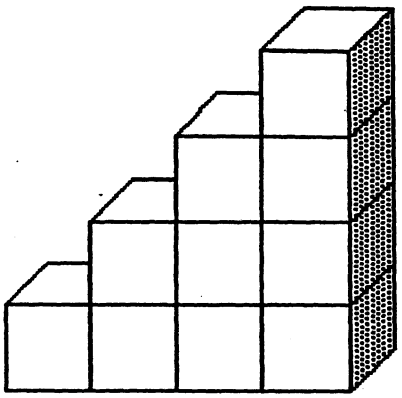
yes *no* d. Six 3-k races, plus a 4-k race, means he ran 22 kilometers that month.

SUNSHINE MATH - 4
Jupiter, XV

Name: _____

(This shows my own thinking.)

★★★★ 1. You have been asked to paint the outside surface of this figure made of cubes glued together. It will take approximately one pint of paint per square face. You do not have to paint the bottom.



a. How many pints of paint will you need?____

b. If the paint costs $4.99 per pint, estimate the cost of the paint to the nearest dollar. ____

★★ 2. In the space to the right draw a quadrilateral with only one pair of parallel sides.

The name of this quadrilateral is a: _____

★★ 3. Ricardo bought one-half dozen donuts for his family. Family members ate one-half of the donuts. How many were left for Ricardo to eat?

Answer: _____donuts

★★ 4. A commercial says "Four out of five dentists surveyed chose sugarless gum for their patients." If 1000 dentists were surveyed, how many recommended sugarless gum?

Answer: _____

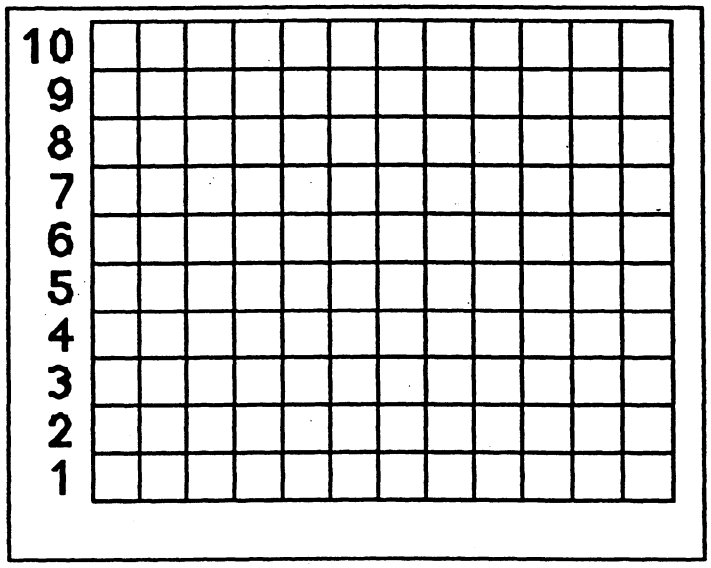
★★ 5. What number from 1 to 25 has the most factors? _____

List its factors: _____

★★ 6. Fill in the bar graph below with the data given. Write a title and label the bottom axis.

Antonio surveyed his 36 classmates to find the month of their birthdays. He tallied: 5 in January, 4 in February, 1 in March, 2 in April, 1 in May, 4 in June, 4 in July, 2 in August, 3 in September, 4 in October, 0 in November, and 6 in December.

TITLE: _____

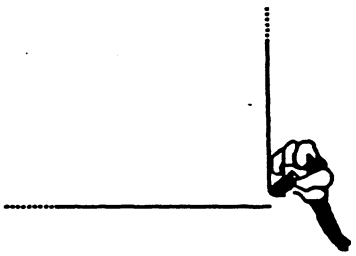


★★ 7. A skating rink plays different songs during a two-hour skating party. The songs average 3 minutes each. There is a 15-minute break, without music, when the refreshments are served. How many songs do they need to have ready?

Answer: _____ songs

★★ 8. A pencil can draw a line 36 miles long, according to research. Mickey decided to test that theory and draw his 36 miles in the shape of a square, so he would wind up back where he started. How long would each side of the square be?

Answer: _____ miles

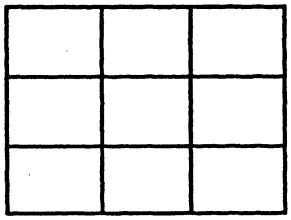


SUNSHINE MATH - 4
Jupiter, XVI

Name: _____

(This shows my own thinking.)

★★ 1. Shade part of the diagram below to show $\frac{1}{3}$ of $\frac{1}{3}$ of the whole rectangle.



★★★★ 2. The table below lists mid-season baseball won-loss records for the Central division of the National League. Answer the questions based on the information provided in the table.

CENTRAL	W	L	TOTAL GAMES
St. Louis	31	40	
Cincinnati	43	25	
Houston	38	31	
Chicago	37	33	
Pittsburgh	30	37	

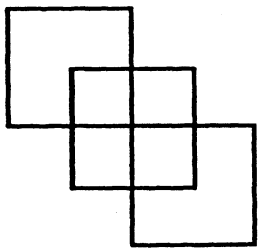
a. Fill in the total games column on the table for each team.

b. Which team has the highest winning percentage? _____

c. Which team has the lowest winning percentage? _____

d. What is the average number of games played per team? _____

★ 3. How many squares?

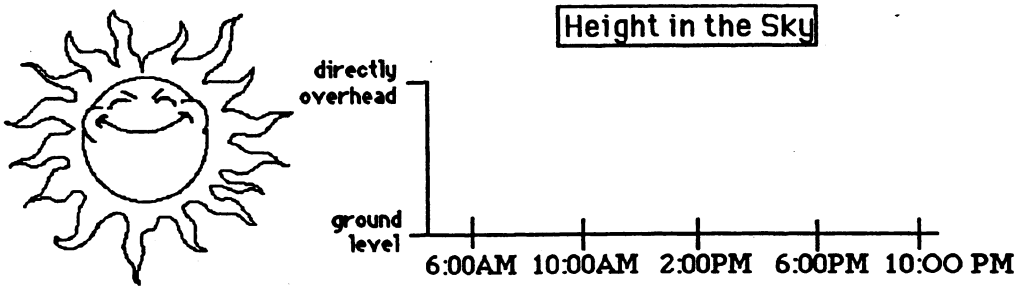


Answer: _____ squares

★★★ 4. The Fashion Store is having a Spring sale. The dresses are $\frac{1}{2}$ off and the shoes are $\frac{1}{4}$ off the regular price. Sandy buys a dress that was regularly priced at $94.50 and shoes to go with the dress that were regularly priced $29.96. What was the total amount she spent on just these two items?

Answer: _____

★★ 5. Make a line graph to show the approximate position of the sun during a sunny summer day. The sun rises at 6:00 AM and sets at 9:00 PM.



★★ 6. Ken is about to eat a bag of M&M's on the 4th of July. The number of each color M&M is listed in the table below. Answer the questions.

green	**11**
red	**8**
yellow	**13**
tan	**7**
brown	**10**
blue	**5**

a. If Ken picks the first M&M out of the bag without looking, what is the chance he will pick a brown one to match his eyes? _____

b. What is the chance his first one will match a color in the American flag? _____

★★ 7. Mike needs to buy 4 packages of pencils at 89¢ each, 2 packages of paper at $1.19 each, and an eraser package for 95¢. He has $10.00. Estimate to the nearest dollar how much money he will have left.

Answer: _____

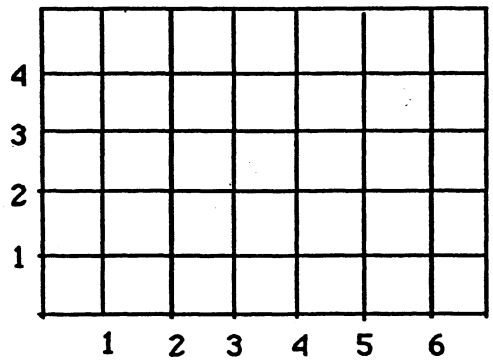
SUNSHINE MATH - 4
Jupiter, XVII

Name: _____

(This shows my own thinking.)

★★★ 1. Make big dots on the grid for the following ordered pairs, and label them A, B, C, or D.

A is (2,4); B is (6,4); C is (6,1); D is (2,1)



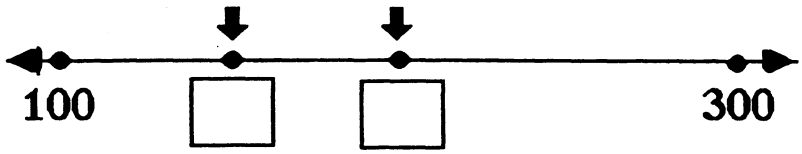
a. Connect A to B to C to D to A with a heavy pencil line.

b. Name the shape you drew. _____

c. Give the *area* of the shape in square units.

_____sq. units

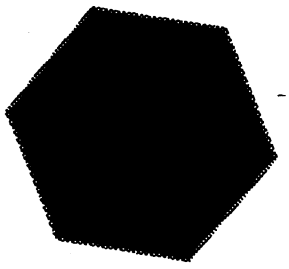
★★ 2. Write in the boxes the numbers to show the arrows' positions on the number line.



★★★ 3. The *Guinness Book of World Records* states that the largest pumpkin on record weighed 671 pounds. If this pumpkin was lifted onto the scales by 11 fourth graders, on average, how much would each student be lifting?

Answer: _____ pounds

★★★ 4. The computer tables in a classroom were placed together to form the polygon pictured to the right.



a. Name the polygon that was formed. _____

b. How many angles does this polygon have? _____ angles

c. Are the angles ***acute***, ***obtuse***, or ***right***? _____

★★ 5. In the United States, every 57 minutes an underage drinker is involved in a traffic fatality. A recent report urges a crackdown on teen-age drinking and driving. Estimate the number of underage drinkers involved in traffic fatalities each day.

Answer: _____

★ 6. Decide if an estimate or a precise calculation is appropriate for each situation. Write "estimate" or "precise calculation" in the answer spaces. Use each term once.

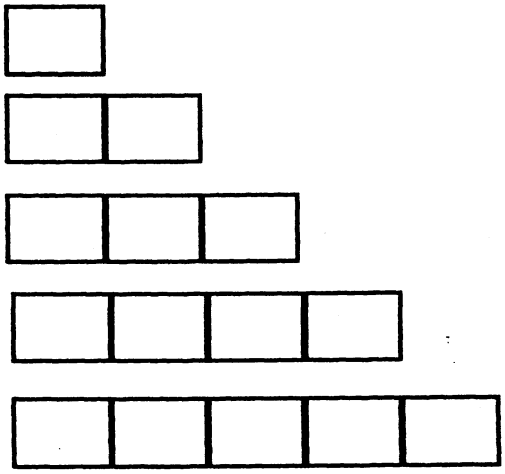
Situation 1: *Checking the change you receive after paying for lunch.*

Answer: _____

Situation 2: *Planning the time it will take to travel from one town to another on a trip.*

Answer: _____

★★★★ 7. Fill in the total number of rectangles found in each pattern below.

PATTERN	NUMBER OF RECTANGLES
	_____ _____ 6 _____ _____ _____

★★★ 8. Describe how to find each "next number" of rectangles, without drawing the figure:

Answer: _____

★★ 9. How many total rectangles will there be if 7 small rectangles are used in the pattern?

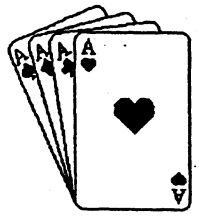
Answer: _____

SUNSHINE MATH - 4
Jupiter, XVIII

Name: _____

(This shows my own thinking.)

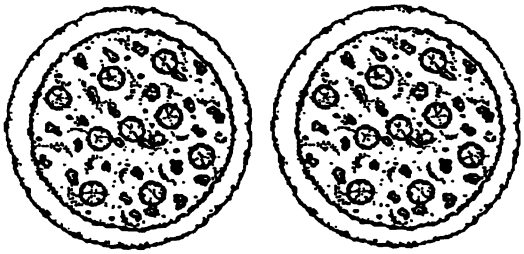
★★★★ 1. You are playing a card game with a full deck of 52 cards. You win if you draw a *red card* that is a *multiple of 5*. What are your chances of winning on your first draw?



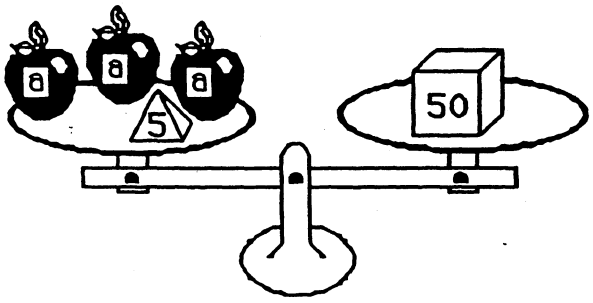
Answer: _____

★★★ 2. The Tappens ordered two pizzas for dinner Friday. Dad ate $\frac{3}{4}$ of one pizza, Jenny ate $\frac{1}{8}$ of a pizza, Danny ate $\frac{1}{4}$ of a pizza, and Mom ate $\frac{1}{2}$ of a pizza. What fraction of a pizza was left for a midnight snack?

Answer: _____ of a pizza



★★★ 3. Leah liked to balance objects she found around the house using the science kit she got for Christmas. She found that 3 identical apples and a 5-gram weight exactly balanced a 50-gram weight. Leah said she could tell how much each apple weighed by solving the equation $3a + 5 = 50$. Prove Leah was correct by finding the weight of 1 apple.

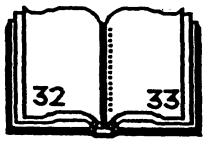


Answer: a = ____

★ 4. Apalachee Elementary School has a total of 16 classes. There are 104 fourth graders, divided equally among 4 classrooms. How many fourth graders are in each class?

Answer: _____

★ 5. If one or both of the numbers in a multiplication problem are *even*, the product will be *even*. Therefore if you open a book and multiply the facing page numbers together, the product will be an *even* or *odd* number?



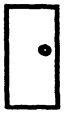
Answer: _____

★★ 6. Tonya is making friendship bracelets for each girl coming to her sleep-over party. Each bracelet will be braided with 4 purple strings, 3 yellow strings, 2 green strings and 3 blue strings. She is expecting 8 friends to attend her party. Each string costs 10 cents. It takes Tonya about 20 minutes to braid each bracelet.

a. How much will the string cost Tonya? _____

b. How long will it take Tonya to make all the bracelets ? ____ hours and ____ minutes

★ 7. About how long is it around the outside edge of an ordinary door in your home? Circle the best answer below.



(a) 10 meters (b) 4 meters (c) 15 meters (d) 6 meters

★★ 8. Below is a bus schedule showing departure times and arrival times from various cities in Florida to Ft. Lauderdale. How much time does the longest trip take?

DEPARTURES		ARRIVALS	
Jacksonville	8:30 AM	Ft. Lauderdale	3:00 PM
Tallahassee	7:30 AM	Ft. Lauderdale	7:00 PM
Tampa	10:00 AM	Ft. Lauderdale	3:00 PM
St. Augustine	8:00 PM	Ft. Lauderdale	4:00 AM

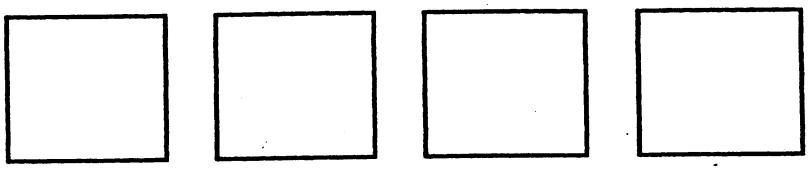
Answer: _____ hours and _____ minutes

SUNSHINE MATH - 4
Jupiter, XIX

Name: _____

(This shows my own thinking.)

★★ 1. Divide each of the squares below differently so they represent fourths.



★ 2. Tiger roared every time someone passed its home in the zoo. Tiger roared more than 39 times but fewer than 46. It roared an odd number of times. You say the number when you count by 3's and by 5's. How many times did Tiger roar?

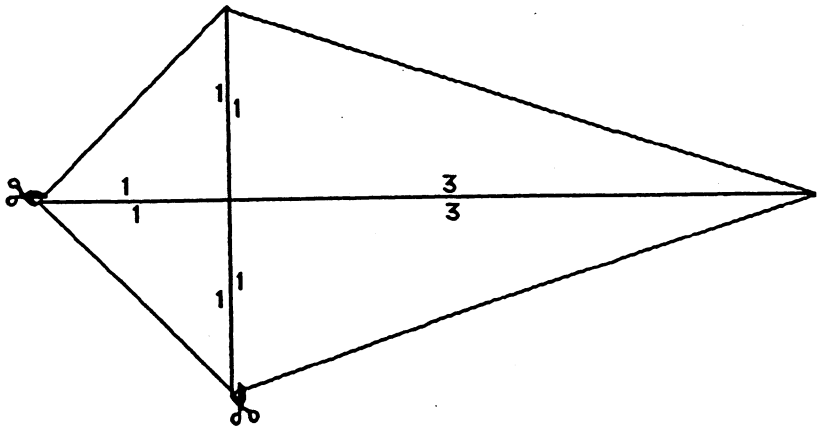
Answer: _____ times

★★ 3. Paul Lynch holds the world record for one-arm push-ups. Paul once did 3,855 one-arm push-ups in five hours. On average, how many did he do in 1 hour?

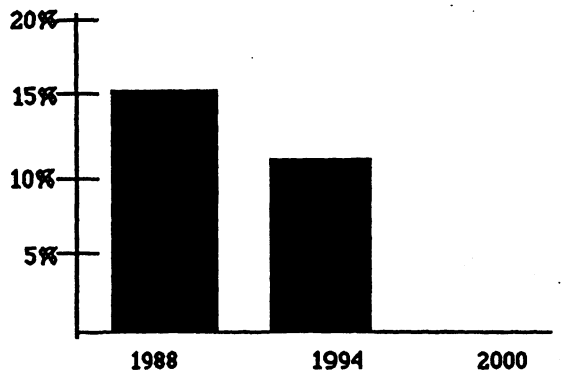
Answer: _____ push-ups

★★ 4. Trace over the figure of the kite below. Cut along the lines of your tracing that go from vertex to vertex so you have four triangles. Arrange these triangles so they make two quadrilaterals: a square and a rectangle. Find the perimeter of each quadrilateral.

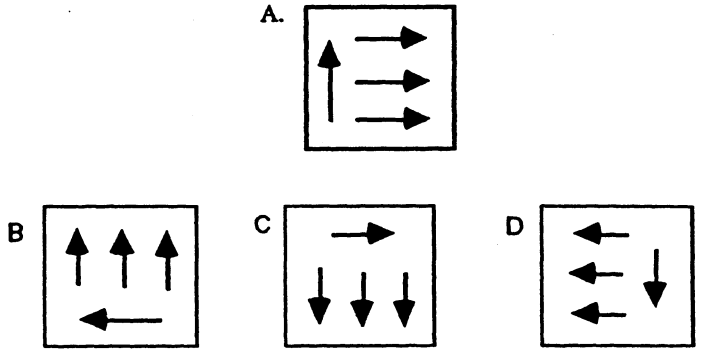
Perimeter of the square: _____ Perimeter of the rectangle: _____



★★ 5. The bar graph shows the percent of women who were members of elected parliaments or legislatures in 1988 and 1994. Fill in the graph to show the percent in the year 2000, if the decline is the same from 1994 to 2000 as it was from 1988 to 1994.



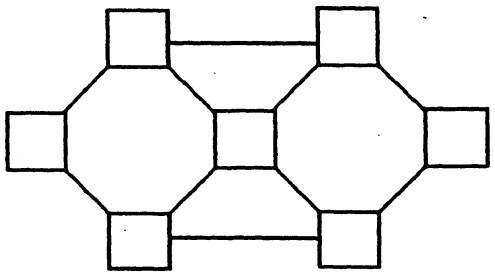
★★ 6. Circle the figure below -- B, C, or D -- that shows figure A rotated 270 degrees clockwise.



★★ 7. During the last week of school, a few students got the silly willies on Monday. On Tuesday, 2 more students than on Monday caught the silly willies. Each day after that, 2 more students than on the day before caught them. On Friday, 12 students caught them. How many students caught the silly willies in 5 days?

Answer: _____ students

★★ 8. Arrange the digits 1-7 in the squares so that no two consecutive digits are connected by a line.



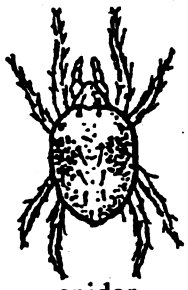
SUNSHINE MATH - 4
Jupiter, XX

Name: _____

(This shows my own thinking.)

★★★★ 1. The owner of "Pets On The Go" pet store currently has the following animals in his store: 5 dogs, 4 cats, 12 birds, 2 turtles, 3 snakes, 2 giant lizards, 1 pot-bellied pig, and 4 spiders . How many legs were on the 33 animals?

Answer: _____ legs



spider

★★ 2. Mrs. Rickets is a farmer. She grows fruits and vegetables. The largest pumpkin she has ever grown weighed 68 pounds. The largest cantaloupe she has ever grown weighed 12 pounds, 8 ounces. What is the difference in weight between the pumpkin and the cantaloupe?

Answer: _____ pounds, ____ ounces

★★★ 3. If a customer wanted to buy Mrs. Ricket's largest canteloupe and the price was 50¢ per pound, how much would the customer have to pay?

Answer:_____

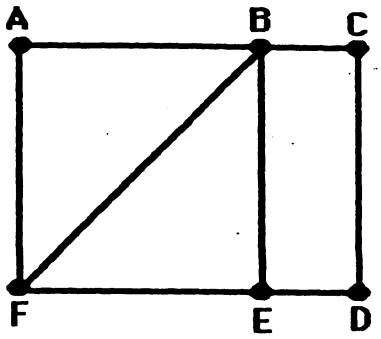
★ 4. Mark hid a $10 bill inside his favorite book. He forgot the pages where he hid it. If the sum of the pages where the bill is hidden is 177, on what pages will Mark find his money?

Answer: page ____ and page _____

★ 5. Mr. Dexter brought home $\frac{1}{2}$ dozen eggs. He accidently dropped the carton on the floor and $\frac{1}{3}$ of the eggs broke. How many eggs does he have left?

Answer: _____ eggs

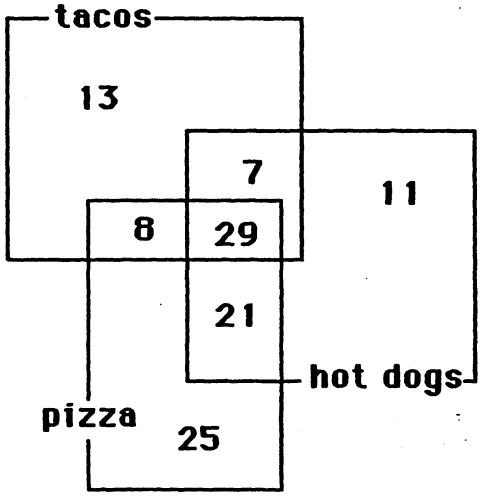
★★ 6. If you start in the right place, you can trace this entire map with your pencil without retracing a path between two points. Circle the two points where you can start to do this amazing feat!



★★ 7. The 6 fourth-grade classes at Marathon Elementary School are having a kick-ball tournament. Each class must play each other once in the tournament. How many kick-ball games must be scheduled?

Answer: _____ games

★★★ 8. The cafeteria staff at Fairlawn Elementary took a poll of its fourth grade students to find out how many students liked hot dogs, pizza, or tacos. The results are shown in the Venn diagram below.



a. Sixty-eight students liked hot dogs. How many students like tacos? _____ students

b. How many students liked both pizza and tacos, but not hot dogs? _____ students

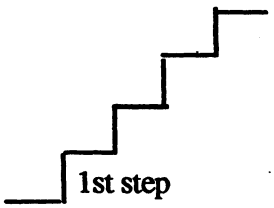
c. How many students liked all three types of food? _____ students

SUNSHINE MATH - 4
Jupiter, XXI

Name: _____

(This shows my own thinking.)

★★★ 1. A cricket and a flea decided to hop on a set of stairs. The flea takes 2 steps in 1 hop. The cricket takes 3 steps in 1 hop. The set of stairs has 12 steps.



a. On which steps will both the cricket and the flea land?

Answer: _____

b. On which steps will neither of them land?

Answer: _____

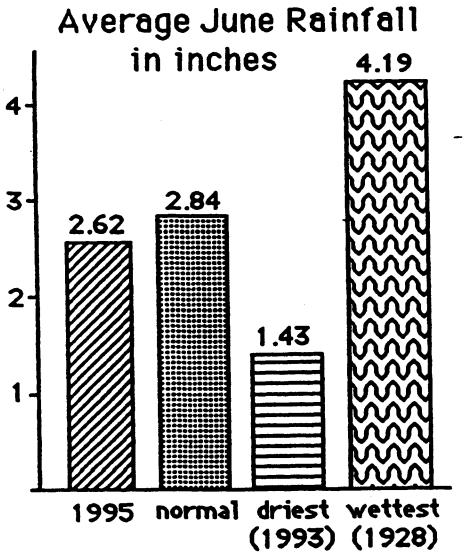
★★ 2. Bill Cosby is one of the leading money makers in the entertainment business. If he earns $92 million for two years' work, how much would he earn for five years' work?

Answer: $_____ million

★ 3. The answer to problem 2 uses a short word name for a large number. Rewrite the answer to problem 2, but do not use "million." Remember -- this answer involves money!

Answer: _____

★★★ 4. Study the bar graph which shows the average precipitation for the month of June in the United States. Answer the questions pertaining to the graph.



a. Was June 1995 drier or wetter than normal?

Answer: _____

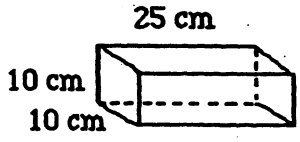
b. What is the difference in rainfall between the wettest and driest Junes on record?

Answer: _____ inches

c. How many years' difference exists between June 1995 and the wettest June on record?

Answer: _____ years

★★★ 5. A bricklayer is working with bricks of the size shown to the right. She puts a 2-cm layer of mortar between each row of bricks. How high will the wall be when 10 rows have been laid?



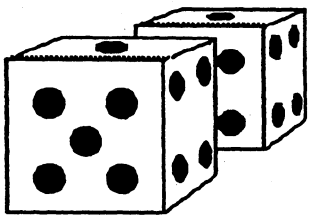
Answer: _____ cm

★ 6. It is recommended that children from ages 7 to 10 eat about 2000 calories per day. Andy is 8 years old. Listed below is everything Andy ate Tuesday. Did Andy eat less than, more than, or equal to the recommended amount of calories?

Breakfast	Lunch	Snack	Dinner
cereal (240 cal.)	Egg-salad sandwich (230 cal.)	cheese (114 cal.)	lasagna(330 cal.)
milk (225 cal.)	applesauce (53 cal.)	crackers (20 cal.)	milk (150 cal.)
banana (100 cal.)	milk (150 call.)	yogurt (180 cal.)	pear (90 cal.)
	potato chips (105 cal.)		ice cream (230 cal.)

Answer: _____

★★ 7. You can roll two dice at a time, a white one and a red one, and there are 36 different ways for the "up faces" to land. The pair of dice to the right show the only way that a sum of two can come up. How many of ways will give a sum of 7 on the two up faces?



Answer: _____ ways

★★★ 8. About how many people lying head-to-toe are needed to stretch around the earth? Is it closest to: (a) 1 million, (b) 25 million, or (c) 100 million? (Hint: The distance around the earth is approximately 25,000 miles.)

Answer: _____

SUNSHINE MATH - 4
Jupiter, XXII

Name: _____

(This shows my own thinking.)

★★ 1. If the 24th day of the month falls on Saturday, on what day did the 6th fall?

Answer: _____

★★★ 2. There are 4 six-packs of soda in a case. Chris bought $\frac{1}{2}$ of a case and gave $\frac{1}{3}$ of what he had to Dana. How many cans of soda does Chris have left?

Answer:_____cans

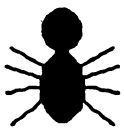
★★★ 3. Together, 6 boys and 12 girls weigh 1050 pounds. The boys all weigh the same, x pounds. Each girl weighs 55 pounds. What is the weight of one boy?

Answer: x = _____ pounds

★★ 4. The sum of 3 consecutive numbers is 276. What are the numbers?
(*Consecutive numbers* differ by one: example: 8, 9, and 10)

Answer:_____, _____, and _____

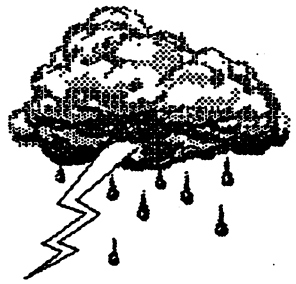
★★ 5. If a family of 12 spiders wore shoes, how many *pairs* of shoes would they need?



Answer:_____pairs.

★★ 6. A tropical storm passed through the town. It began to rain Monday morning at 8:45 AM and did not stop until the next day at 2:30 PM. How long did it rain?

Answer: _____ hours and _____ minutes



★★ 7. There are 3 cars, 4 bicycles, 2 tricycles, and 1 unicycle in the neighbor's garage. How many wheels are there in all? Forget about any "spare tires"!

Answer: _____ wheels

★★ 8. Rosemary bought a sweater on sale for $6.98. She also bought a skirt for $9.99. She paid an additional $1.19 for sales tax. Rosemary gave the sales person a $20 bill. How much change should she receive?

Answer: _____

★★★ 9. Study this pattern. 25 and also 32 would be in column E, if the pattern continued.

a. In which column would 100 appear? _____

b. In which column would 500 appear? _____

c. In which column would 1000 appear? _____

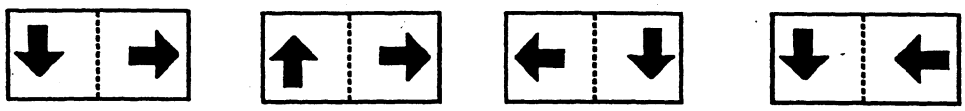
.	.	.	.	.	.	.
21	22	.	.	.	.	.
14	15	16	17	18	19	20
7	8	9	10	11	12	13
0	1	2	3	4	5	6
A	B	C	D	E	F	G

SUNSHINE MATH - 4
Jupiter, XXIII

Name: _____

(This shows my own thinking.)

★★ 1. The design to the right was drawn on a piece of clear plastic. The plastic was turned 180° clockwise, which is half of a complete rotation. It was then flipped over on the dotted line. Circle the picture below that shows how the design looks after these movements.



★ 2. If the heaviest dog in the world is 310 pounds and the next-heaviest is 14 pounds less, how much does the next-heaviest dog weigh?

Answer: _____ pounds

★★ 3. Sunae's group of close friends are going to fifth grade in September. All are going to Belleview Elementary and their homerooms will be rooms 12, 14, or 16. All of her friends but 4 are going to room 12, all but 4 are going to room 14, and all but 4 are going to room 16. Not counting Sunae, how many children are in her group of close friends?

Answer: _____ friends

★★★ 4. Sam and Suzie are twins. Sam has as many brothers as he has sisters -- Suzie has at least 1 sister, and twice as many brothers as sisters. How many kids are in the family altogether ?

Answer: _____ kids

★★ 5. Josh bought a shirt for $12.95, a belt for $6.95, and a pair of jeans for $27.97. The tax came to $3.35. How much change did he receive if he gave the clerk 2 twenty-dollar bills and 2 ten-dollar bills?

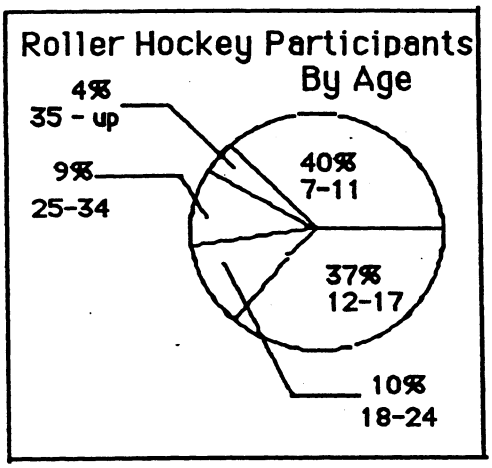
Answer: $ _____

★★★ 6. Danny's age is 13 and his favorite sport is roller hockey. Answer the questions about roller hockey participants using the circle graph below.

a. How many ages are included in Danny's age group? _____

b. List the age groups from greatest to least based upon their percent of participation.

Age Group	% Participation
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____



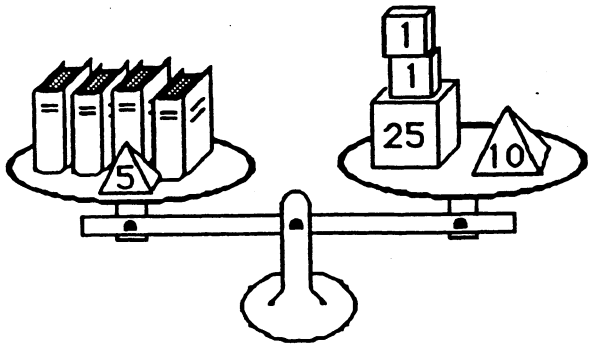
c. Use the data from part (b) to make a conclusion about participation in roller hockey as you get older:

Answer: _____

★★ 7. What number am I? Answer: _____

I am even.
I am not 7 x 10 or less.
I am not a multiple of 4.
I am not a multiple of 3.
I am less than 10 x 10 - 20.

★★★★ 8. Four identical books and a 5-ounce weight balance 37 ounces. The equation $4x + 5 = 37$ expresses this situation, where x is the weight of 1 book. How much does 1 book weigh?



Answer: $x =$ _____ ounces

SUNSHINE MATH - 4
Jupiter, XXIV

Name: _____

(This shows my own thinking.)

★★★ 1. The Daily News costs $0.35 at the news stand and is published Monday through Friday. You can also buy a four-week subscription for $4.75. If you bought a four-week subscription, how much would you save over buying it for four weeks at the daily rate?

Answer:_____

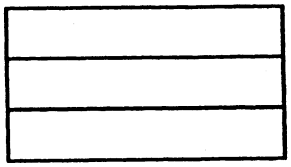
★★★ 2. Put > or < in the box.

$$\frac{1}{2} + \frac{3}{4} \quad \square \quad \frac{2}{3} + \frac{1}{2}$$

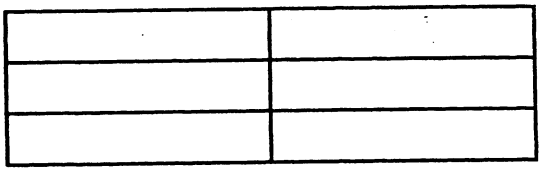
★★ 3. If you drink 1 can of soda each day, about how many milliliters would you drink in one year? (A can of soda is 354mL. Round your answer to the nearest ten thousand mL.)

Answer:_____ mL

★★★ 4. There are 6 rectangles formed by the lines in this figure:



How many rectangles are formed by the lines this figure?



Answer:_____rectangles

★★ 5.

4 weeks	3 days	13 hours	21 minutes
- 2 weeks	6 days	19 hours	31 minutes

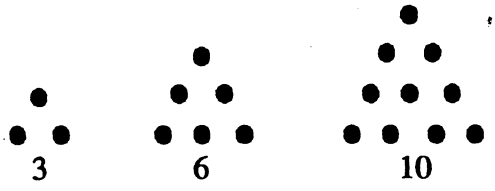
★★★ 6. Which pair of numbers, whose sum is 35, have the largest product?

Answer:_____

★★ 7. Fill in the missing letter of the alphabet in this pattern:

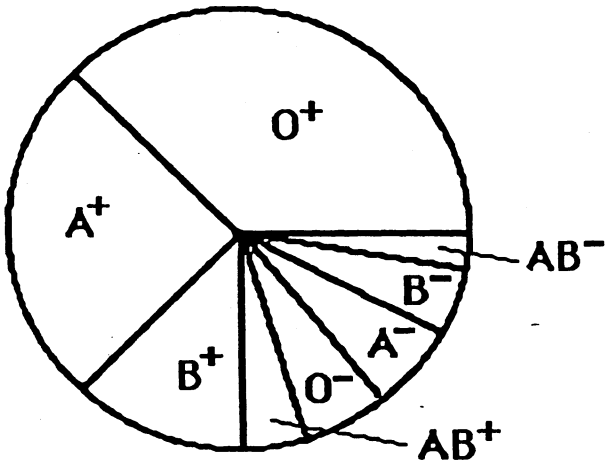
M V E M J S U N ____

★★★★ 8. Here are the first three triangle numbers: 3, 6, and 10.



What are the next four triangle numbers? Answers: ____, ____, ____, ____

★★★ 9. Everybody in the world has one of the eight blood types shown in the circle graph. The size of the region gives you an idea of the percent of people in the world with that type of blood. O^+ (read "oh positive") occurs more often than any other blood type -- 36% of the people in the world have O^+ blood. Answer the questions below.



a. About what percent have A^+ blood? ____

b. What is the most rare blood type? ____

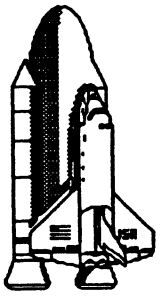
c. If a person in your school were picked at random, would they be more likely to have AB^+ or O^- blood? _____

SUNSHINE MATH - 4
Jupiter, XXV

Name: _____

(This shows my own thinking.)

★★ 1. When the Space Shuttle lifts off, it has moved 3 km by the time you clap your hands once. By the time you clap twice, the Shuttle has moved 9 km. By the 3rd clap, it has moved 27 km, and by 4 claps and it has moved 81 km. If this pattern continues, how many km has it moved by the time you have clapped 10 times?

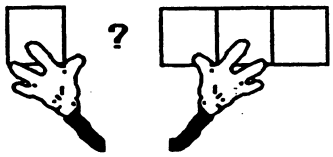


Answer: _____ km

★ 2. Maria needed some magazine pictures for a social studies project. She cut out pages 20, 21, 47, 48, and 104. How many sheets of paper did she remove from the magazine?

Answer: _____

★★★ 3. Draw three different ways to put four square tiles together. Each tile must be connected to at least one other tile along an entire side. What is the perimeter of each arrangement? What is the area of each arrangement?



Drawing 1

perimeter: _____

area: _____**sq units**

Drawing 2

perimeter: _____

area: _____ **sq units**

Drawing 3

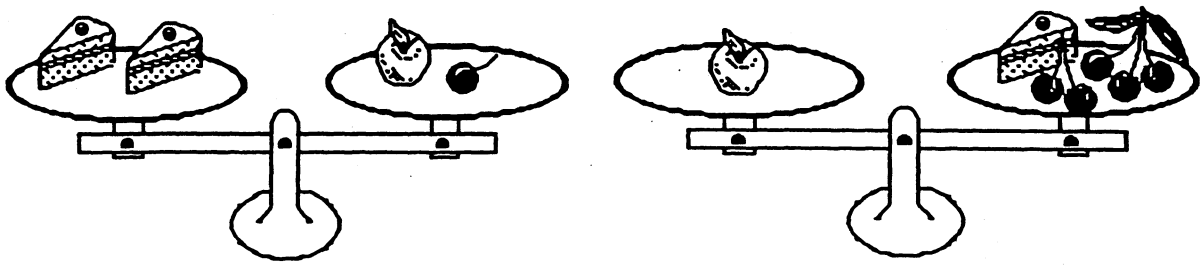
perimeter: _____

area: _____ **sq units**

★★ 4. Ms. Croskey just put her students in groups of three. Tia, Jonathon, and Courtney are in a group together and are arguing over who is going to sit by whom. How many ways can the three students be arranged in the chairs?

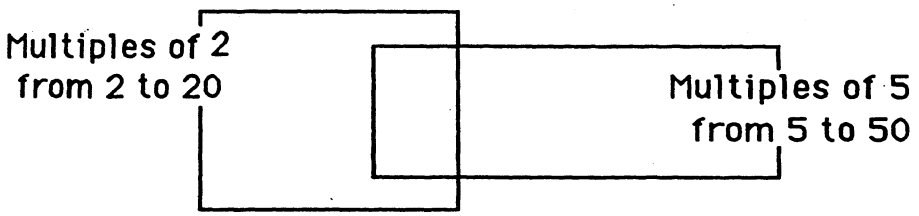
Answer: _____ ways

★★★ 5. Two pieces of cake weigh as much as one apple and one cherry. One apple weighs as much as five cherries and one piece of cake. How many cherries weigh as much as one apple?



Answer: ____ cherries = 1 apple

★★ 6. Fill in the Venn Diagram to represent the data provided.



★★ 7. Find two numbers that add to 19 and multiply to 84.

Answer: _____ and _____

★★★ 8. Shirley has 18 coins. One sixth of the coins are quarters, one third of the coins are dimes, and one half of the coins are nickels. What is the value of Shirley's coins?

Answer: _____

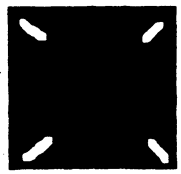

ANSWERS

Commentary

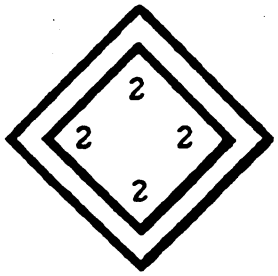
Jupiter, I

1. **(a.7; b. 8; c. 3; d. 24)** Students could practice making up their own Venn Diagrams about the class by picking characteristics such as eye color and hair color, or clothing combination. In this problem, the difficult part is (d) -- some students will try to use the numbers 7, 8, and 3 to get the total in the clubs.

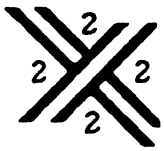
2. **(36)** Angles have been identified in the figures.



4 right angles in the big black square



8 right angles in each white squares (16 total)



8 right angles at the intersection of the white squares (16 total)

3. **(Monday)** Students might make a list --*S, M, T, W, T, F, S* -- and start counting with Friday, till they get to 24.

4. **(a. 149; b. 599; c. 30; d. 3x*n* - 1)** The first two parts ask the student to notice that each second number is obtained by multiplying the first number by 3, then subtracting 1. Part (c) asks them to reverse this thinking, and part (d) asks them to generalize the pattern to any number *n*. The answer for (d) might be written in a number of different, equivalent ways.

5. **(60 and 12)** Students may use "guess and check" by listing the pairs of addends whose sum is 72; their guessing should get more precise as they get closer to finding the correct pair. They might get a hint as to where to start by noticing that the difference being 48 means that one of the numbers is above 50.

6. **(d. $3.18)** The problem has students use their real-world number sense to get an answer.

7. **(75¢)** Three for 25¢ means that nine would cost 75¢; 10¢ each means that nine would cost 90¢.

Commentary

Jupiter, II

1. **(2 years)** One-half inch per month means 1 inch every 2 months. Students can therefore count month's "by twos" until they get to 12 inches. The count of 24 months is 2 years.

2. **($1.50)** Students at this grade level know intuitively that 50% is 1/2, and they can find 1/2 of dollar amounts, usually without any actual computation. 1/2 of $6 is $3, and 1/2 of $3 is $1.50.

3. **(104, 68, 50)** The unusual thing about this pattern is that it's much easier if you start at the right end, and work to the left. You can see that you are adding 9 each step.

4. **(45)** Students will likely use a calculator to solve this problem. A few might notice that the sum of the first n counting numbers is $n \times (n + 1) \div 2$. Therefore the problem becomes finding the first or smallest n such that $n \times (n + 1) \div 2 \geq 1000$.

5. **(6:12 pm)** This problem involves elapsed time. Students can add 1:45 and 4:27, but they must remember that they aren't in the decimal system. They should get 5:72, and since 72 minutes is 1 hour and 12 minutes, 5:72 can be rewritten as 6:12.

6. **(Maria: 10; Patsy: 8; Colleen; 9; Kenyada: 11)** Students might make a list, or they may make name cards and act the problem out.

7. **(20 spaces ahead)** Each color should come up about 1/3 of the time. However, the orange moves and the blue moves cancel each other out, leaving about 1/3 of the time moving ahead 2 spaces. 1/3 of 30 spins is 10 spins, and at 2 spaces each move, you would be ahead 20 spaces.

8. **(She was wrong. x = 33 grams)** Students can see intuitively that 1 block can be removed from both sides of the balance scale, leaving 3 sharpeners and 1 gram to balance 100 grams. Then the 3 sharpeners must weigh 99 grams, and then each would weigh 33 grams. x is used simply to introduce the idea of an unknown quantity as a variable.

Commentary

Jupiter, III

1. **(The diagonal from upper left to lower right should be ringed.)** Give students one star for having all the correct products in the chart, and another for the correctly-ringed diagonal.

2. **(12)** The ratio of 48 to 60 is the same as the ratio of 24 to 30, or 12 to 15, or 4 to 5. He would get the most bags possible by working with the 4 to 5 ratio, putting 9 items in each bag. This would give 12 bags, as 12 x 4 is 48 and 12 x 5 is 60.

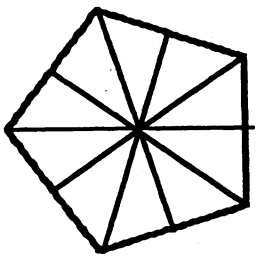
3. **(1:00)** The only difficult part of this problem comes if students try to compute 10:45 + 2:15, because they are not in the decimal system with time. The sum of 10:45 and 2:15 is 12:60, which is 1:00. Students with good number sense will likely "count on" from 10:45, using hours and then quarter hours.

4. **Green** **Black** **Yellow**
   Red **Blue** **Orange**
   Students can be encouraged to solve such logic problems by making a chart, and proceeding by process of elimination.

5. **($4)** Students should have an intuitive feel for this type of problem, rather than subtracting $11.15 from $15.00, and rounding the answer. They should know that $11.15 is close to $11, and $15 - $11 is $4.

6. **(a. 6; b. 63)** 64 play, then the 32 winners of those matches play, then the 16 winners of those matches play, then the 8 winners of those matches play, then the 4 winners of those matches play and finally the last two winners play. This is 6 rounds of golf, and the winner must play in all of those. Since there are 63 losers, and each had to play a match to lose, there are 63 matches altogether.

7. There are 5 such lines of symmetry, as shown below.



8. **(3,897)** There are several clues that make this *guess-check-revise* problem a little friendlier. Since the sum of the four digits is 27, the average size of the digits must be fairly large. However, the *thousands* digit has to be either a 1, 2, or 3, while the corresponding *tens* digit is a 3, 6, or 9. Pick the 3 to begin the search, using 9 for the *tens* digit, and make the last digit a 7 since that's the largest odd digit not already used. This gives a sum of 27, as required, if 8 is the *hundreds* digit.

Commentary

Jupiter, IV

1. **(a. 70; b. 2520)** The student can multiply 14 times 5 for (a), and 14 times 180 for (b).

2. **(65° F)** Students can add 15 to 72, then subtract 22.

3. **(24)** Students may want to make a list and establish a pattern in order to solve this problem. They might name the pots shown as A, B, C, and D, and then see how many lists they can make, such as ABCD, ABCD, ACBD, ACDB, ADBC, ADCB. Those six are all the orders possible if A is on the left. There would be 6 such with B starting on the left, and 6 with C and 6 with D also, for a total of 24.

4. **(423)** *Guess-check-revise* is one way to solve the problem. A starting hint is that since the sum of the digits is nine, their average value is 3 so they are all small numbers.

5. **(Saturday)** Students might use calendar, or list S, M, T, W, T, F, S, and start counting with 7 on Tuesday, and count to 25.

6. **(a. 3 million; b. 36 million; c. 2 1/2 billion)** The problem situation calls for estimated answers rather than exact numbers, which would be misleading in such a problem. Students should be allowed leeway in their estimates, as they can vary quite a bit. Hopefully students will use a calculator to find (a), and continue to use it in finding (b) and (c) by entering only the non-zero digits to fit into the 8-digit calculator.

7. **(a. 10; b. 9; c. 9)** Students may use cubes or blocks to construct models. Students with good spatial visualization can find the answers from the pictures.

8. **(car and donkeys)** Students can approach this in a number of ways. Since the car matches 3 elephants from the second picture, they can be "removed" from the last tug of war without affecting the situation. Thus we are left asking which would win, 1 elephant matched against 3 donkeys. From the first picture, we see that an elephant pulls as much as 2 1/2 donkeys, so 3 donkeys would put pull one elephant. Therefore a car and 3 donkeys would out pull 4 elephants.

Commentary

Jupiter, V

1. **(a. Answers will vary -- 10 and 11 are the most common answers; b. Answers will vary.)** Students should use a calculator to compute:

   25 x 60 x 16 x 365 x (answer for part a)

   If part a is 10, the answer is 88 million; if part a is 11, the answer is 96 million.

2. **(11 quarters, 4 dimes)** Some students will randomly use *guess-check-revise*, while others realize that the amount of money in quarters alone should be fairly close to $3.15, and begin working backward from there, using *guess-check-revise.*

3. **(rectangle: 28 cm; 2 triangles: 32 and 36 cm; 2 parallelograms: 32 and 36 cm)** These are the four most likely answers, but a quadrilateral could also be built with a perimeter of 36 cm. Note: parallelograms cannot be named as rectangles.

4.

$$\begin{array}{rcccc} & 4 & \boxed{5} & 6 & 8 \\ & & 5 & \boxed{9} & 6 \\ + & \boxed{5} & 9 & 4 & \boxed{7} \\ \hline 1 & 1, & 1 & 1 & 1 \end{array}$$

5. **(c. dime)** A century is ten times a decade; likewise, a dollar is ten times a dime.

6. **(12)** Students have to consider a problem that is not one usually asked. If 3 is 1/4 of some number, what number is it?

7. **(2 out of 3 chances, or 2/3, or 67%)** There are three spaces left, and two of those will result in a win for the computer. Any of the three spots are equally likely to be selected, so the chance is 2/3 of a win.

8. **(25, 3, 3, 9)** Students familiar with a Venn Diagram should have little difficulty with this problem. All the X's are counted for the first answer. Only 3 X's are in the RAP ring only. Three students are in the overlap between rock and country, but not in RAP. There are 9 students that are in the RAP and country circles together, but not in the rock circle.

Commentary

Jupiter, VI

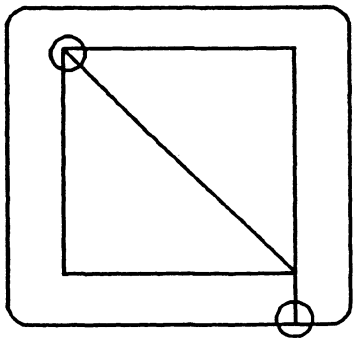
1. **(28 hours, 30 minutes)** Students will likely count from 7:15 one morning to 7:15 the next morning as 24 hours, and then count up by the hour to get to 11:15, finally counting a half hour to 11:45.

2. **(770 feet)** Students may draw the diagram and sub-divide it into two parts. Also, students can figure out the missing lengths. 150 ft.+ 200 ft. + 185 ft. + 25 ft. + 35 ft. + 175 ft. = 770 ft. It is interesting to note that the perimeter of this figure is the same as if the figure were a 185 by 200 foot rectangle.

3. **(a. $33.10; b. 45; c. 1/32)** The pattern for (a) is that each number increase by 20¢. For (b), each succeeding number decreases by half. Each next number in (c) is also half of the preceding number.

4. **(B)** Box A has a 3 out of 5 chance to win with red. Box B has a 2 out of 3 chance to win with red. If students change ratios so that they are based on the same second number, the result will be obvious. 3 out of 5 is the same as 6 out of 10 or 9 out of 15. 2 out of 3 is the same as 4 out of 6, 6 out of 9, 8 out of 12, and 10 out of 15. But then 10 out of 15 is a better chance than 9 out of ten. Students may run a probability experiment to verify this result.

5. **(See figure below.)** A network of paths such as the one below can be traced without lifting a pencil, if it has either 0 or two *odd vertices*. A vertex is *odd* if it has an odd number of paths going in or coming out. Furthermore, if you can trace the network, you have to start at one of the odd vertices, and you'll end up at the other. Therefore the two odd vertices circled below are the only places you can start, and trace the path.



6. **(7)** This can be solved by guess-check-revise, or by working backward.

7. **(a. 6; b. 3; c. 49)** Students with good number sense will notice that the fractions involved are either close to zero or close to 1, which means that each mixed number would either be rounded to the whole number showing, or up to the next whole number. In (a), 3 10/11 rounds to 4 and 2 1/101 rounds to 2, so the sum is close to 4 + 2 or 6. In (b), 5 2/47 rounds to 5, and 2 1/35 rounds to 2, so their difference is close to 5 - 2 or 3. In (c), 6 17/19 rounds to 7, and 7 3/290 rounds to 7, so their product is close to 7 x 7 or 49.

8. **(1/6)** Students might draw a diagram to show that 1/3 of 1/2 is 1/6

9. **(0)** The ten one-digit numbers include zero, which makes the overall product zero also.

Commentary

Jupiter, VII

1. **(marble bag)** The chance of drawing a blue marble is 1/3; the chance of drawing a weekend day is 2/7. We must compare these fractions to see which is larger. Finding a common denominator (21) allows us to compare the fractions by comparing the numerators. 1/3 is 7/21, and 2/7 is 6/21, and thus 1/3 is greater than 2/7. Another way to compare the fractions is to use a calculator and change both fractions into decimals, and compare the decimals.

2. **(2000 years)** Many students will think you must multiply 4 and 2000, but the problem doesn't call for any computation if you think carefully about the situation.

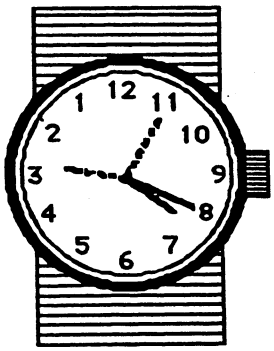
3. **(25)** Students can use grid paper to make the rectangles that have 20 as a perimeter. The one with the largest area can then be found by counting unit squares.

4. **(To get back fewer coins)** Many people use a method like that mentioned to avoid carrying extra coins around in their pockets.

5. **(Juan is 15, Derrick is 5, Tyrone is 10)** A suggested strategy is to use *guess-check-revise* by guessing the youngest person's age, and doubling and tripling that amount to get the other ages, adding to see if the sum is 30. If not, revise the youngest person's age appropriately.

6. **(2:38; 2:57; 3:20; 3:48)** Students will have to either count backwards to get each new time, or subtract. Subtraction involves subtracting across non-base ten numerals.

7. **(See watch to the right.)** The time shown is 2:55, and adding 4:45 to that gives a time of 7:40. Showing 7:40 will be a challenge for many students, on this watch.



8. **(1/10)** A quart is 2 pints, so 5 quarts is 10 pints. One pint is then 1/10 of 5 quarts.

9. **(a. answers will vary; b. answers will vary.)** Whatever a student writes in for (a), use a calculator to find 70% of that number by multiplication. Be lenient in checking accuracy -- give credit for being within one pound of the right answer for (b). Students will employ a variety of methods for finding 70% of their weight, if they don't use a calculator. Some, for example, might reason and take 7 out of every ten pounds they weigh, and then add on some extra for the pounds over a multiple of ten. Others might find 50% or 75% as those are intuitive numbers to work with (1/2 and 3/4) for many weights, and then adjust their answer because 70% isn't exactly 50% or 75%.

Commentary

Jupiter, VIII

1. **(65)** Students may use the *guess-check-revise* method. Some students might get the answer by putting the 36 and 94 on a number line, and deciding the point half-way between.

2. **6 , 4 or 4 , 6**
   2 , 10 or 10 , 2
   6 , 8 or 8, 6
   7 , 9 or 9, 7
   3 , 15 or 15, 3
   30, 1 or 1, 30

   Perhaps the easiest way to solve each of these problems is to focus on the numbers that would give the indicated product, and then see which of those pairs of numbers would give the indicated sum.

3. **(10)** Students may act out this problem, or they might draw a diagram with A, J, S, C, and T around a circle. They would then connect each letter with each other letter with a line, and count the lines.

4. **(B)** This is a two-step problem. Students will first have to find the sum of Karen's grades: 92 + 88 + 99 + 97 + 89 and get 465. Then they will divide 465 by 5 and come up with 93%, which is a B. Students can use a calculator for such situations.

5. **5 0, 6 8 2**
   - 4 3, 8 9 6
   6, 7 8 6

   The problem involves deducing the two missing numbers, and one way is to work through the standard subtraction algorithm for the numbers.

6. **(36° C)** Students should realize that 12°C is too cold, and 120°F is too hot. Therefore by process of elimination, 36°C is the correct choice.

7. **($1. 16)** This is a two-step problem. Students first have to decide how much Rachel spent. She bought 12 stamps at 32 cents each. 12 x $0.32= $3.84. Next, the students compute what her change would be. $3.84 from $5.00 = $1.16.

8. **8 3 7 6**
   8 3 7 6
   1 8 3 7 6
   3 5 1 2 8

   Students can start by looking for the T value. Three such numbers must sum to give an 8 in the ones place; 6 is a good choice. Then knowing 1 is "carried" to the next place, then can solve for N. Proceeding in this way solves the problem.

9. **(a. 70; b. answers will vary.)** Part (a) involves multiplying 10 and 7. For part (b), whatever number the student puts in the first blank, divide the number by 7 in a calculator to get the number in the second blank. The answers will most likely be 9 ÷ 7 = 1 2/7 ≈ 1.3 or 10÷ 7 = 1 3/7 ≈ 1.4 or 11 ÷ 7 = 1 4/7 ≈ 1.6. Be lenient in accepting reasonable answers for part (b), as some students will have the right idea but not know how to divide decimals or round their answers.

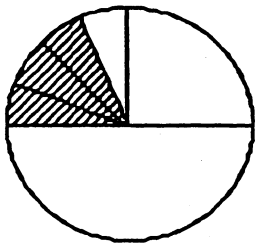
Commentary

Jupiter, IX

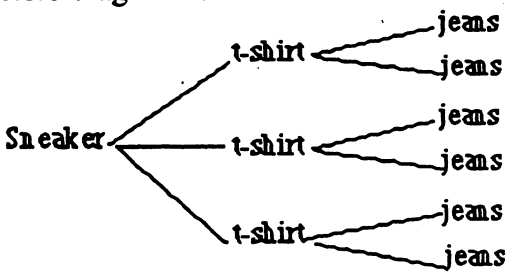
1. **(96)** Students can count the cubes in layers. There would be 16 on each of the 6 layers, or 16 x 6 total cubes.

2. **($5)** Students can compute 25% of $10, 15% of $10, and 10% of $10 and add to get $5 spent. Then $10 - $5 gives $5 left to spend. Another way is to add the 3 percents (25%, 15%, and 10%) to get 50% spent. Then 50% of $10 was not spent, and 50% of $10 is $5.

3. **(See diagram below. 3/16)** Students might show the circle cut in half, then one of the halves cut in half to get fourths, then one of those fourths cut into four pieces, and three of them shaded (see below). If so, it would take 16 of the smaller pieces to make the whole circle, so each is 1/16. Three shaded sixteenths would be 3/16.



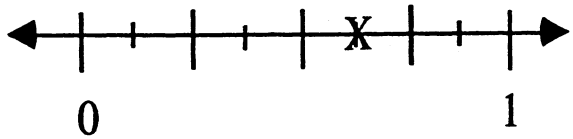
4. **(6)** One possible diagram is:



5. **($3x$ - $14.62 or 3 x x - $14.62 or $x + x + x$ - $14.62 or any equivalent expression)**

6. **(143)** Students will add to find the answer.

7.



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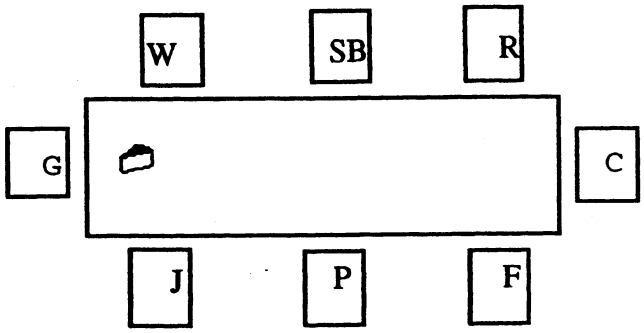
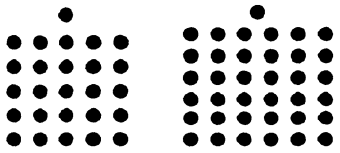


Commentary

Jupiter, X

1. **(See figures below)** Note that each figure is a square with the same number of dots on each side as the figure number, plus an extra dot on top.



5 6

2. **(a. 101; b. 20; $n \times n + 1$)** This problem encourages students to generalize the number of dots for each figure, rather than drawing them. Each figure is made from this number of dots: the figure number, squared, with 1 dot added on top.

3. **(14)** If the mother and one pup weighed 15 pounds, and the mother and two pups weighed 17 pounds, then the extra pup in the second weighing must be 2 pounds. Since all the pups are the same weight, 7 pups would weigh 14 pounds.

4. **(See below.)** There are other solutions. Students may use *Guess-Check -Revise.*

6	1	8
7	5	3
2	9	4

5. **(168)** Multiply 7 by 24.

6. **(b)** Students might use a calculator for this problem. For plan (a), you would earn $55; for (b), you would earn $102.30; for (c), you would earn $60. Students are often surprised at how quickly an amount becomes, when doubled continuously.

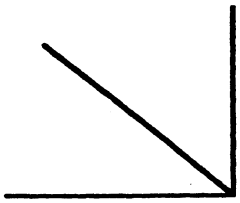
7. **(4)**

8. **(Mom)** Students might take out a deck of cards and count the possibilities. Aces, face cards, and hearts when counted so they aren't counted twice, make up 25 of the 52 cards in the deck. The other cards, 2 through 10 of spades, diamonds, and clubs, would be 27 of the 52 cards. Since 27/52 is a better chance than 25/52, Mom has a slight advantage. But not much.

Commentary

Jupiter, XI

1. **(The fold line should divide the corner in two equal parts as shown below.)**

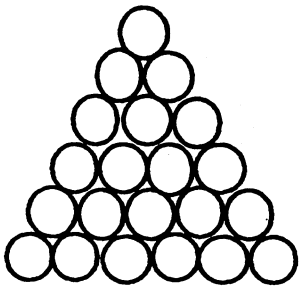


2. **(8)** The fractions are either close to 0 or close to 1. The mixed numbers can then be rounded to produce the following whole number computation: $4 + 3 - 2 + 6 - 3$, which gives 8.

3. **(6)** Calling the three students A, B, and C, there are 6 ways: ABC, ACB, BAC, BCA, CAB, and CBA

4. **(10, 15)** The problem involves simply counting. The next two problems build on this one.

5. **(See the shape to the right.)**



6. **(55)** The number of circles makes the familiar pattern: 1, 3, 6, 10, 15, 21, 28, 36, 45, 55, ... To get each succeeding term, you add one more than what you added in the previous term. To get from 1 to 3, you add 2 to 1. To get from 3 to the next number, you add 3. To get the next term, you add 4, then 5, then 6, and so on.

7. **(a. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47; b. 15 out of 49 or 15/49 or any equivalent; c. no)** The probability of picking a number that is not prime is 34/49.

8. **(a. < ; b. < ; c. =)**

9. **(From the left, the 1st, 3rd, and 5th figures should be circled.)** The first figure has two square faces at its ends. The third figure also has two square bases, although they are "tilted". The fifth figure has only one square face, the one on which it rests.

10. **(25)** The problem will become, in later years, an algebraic situation of the form $60 = 2x + 10$. In this case, the two tubes of glue must weigh 50 grams since $50 + 10 = 60$. If two tubes of glue weigh 50, then each weighs 25.

Commentary

Jupiter, XII

1. **(16)** Students may need help recognizing that the snail is climbing and then falling. Students may draw pictures or use a number line. Some students will think the answer is 20 days because of the snail making progress at the rate of 1 foot per day, but this discounts the fact that once the snail reaches the top on the 16th day, it won't fall back four feet that night.

2. **(3/4, 75%)** The circle is divided equally into four regions, so the chance of landing on each of those regions is 1/4. The chance of landing on any of the three of them is then 3/4.

3. **($12.50)** Some students will find half of $25 as $12.50, and then subtract that amount from $25 and get $12.50 again. Others will simply say that if the item is on sale for 1/2 off, the price you pay is also 1/2 of the price showing.

4. **(81)** Students may want to use a calendar, or set up a chart, in order to solve this problem. There would be 20 days left in October, 30 in November, and 31 in December.

5. **(180)** Students may use the *guess-check-revise* approach. The 2nd clue says the number is in the hundreds. It is possible to then write down the multiples of 12 that are in the hundreds, and check to see which are also multiples of 9 in which the units digit is less than the tens digit.

6. **(a. 180,000; b. 15,000; c. 3)** Part (a) involves multiplying 10,000 and 18; part (b) involves dividing the answer for (a) by 12; part (c) involves dividing (b)'s answer by 5280, and rounding 2.84 miles to the nearest whole number, 3.

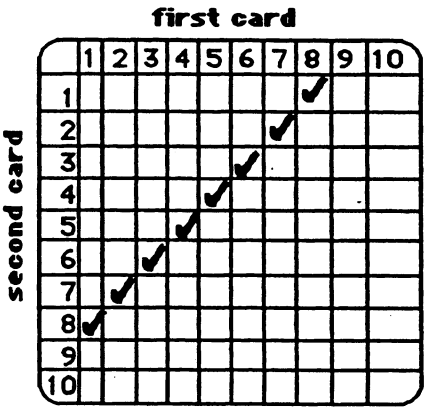
7. **(50)** Students should divide 800 by 16, which is the number of hours the person is awake and burning calories by fidgeting.

8. **($15)** $10 for 100 pretzels means his cost per pretzels is 10¢ each. If he sells them for 25¢ each, he makes a profit of 15¢ per pretzel. Therefore 100 pretzels would bring a profit of 100 x 15¢ or $15. Another solution: when you sell 100 giant pretzels for 25¢ each you make $25. If they cost you $10, your profit is $15.

Commentary

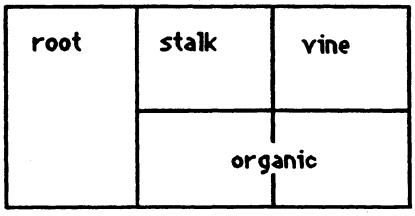
Jupiter, XIII

1. **(8 chances out of 100, 8/100, 8%, 8:100, or a reduced form of these answers, such as 4/50, 2/25, and so forth.)** Students can obtain such an answer by making a chart of the possibilities. The chart below shows the eight possibilities of success, out of the 100 possibilities for the two cards.



2. **(Joey)** Joey earned $1.50 x 20 = $30.00; Susan earned $5.00 x 5 = $25.00.

3. **(2/6 or 1/3)** A diagram such as that below will help the student find the answer. The organic portion is 2 pieces out of 6 that would make the whole garden, hence 2/6 or 1/3 is the answer.



4. **(35 ÷ 7 = 5)** The problem is a simple partitioning interpretation of division.

5. **(a. 5 feet by 4 feet; b. 15 kilograms)** Both problems involve number sense. Students can eliminate all the unreasonable answers simply because of what they know about the size and weight of a bicycle.

6. **(a. 9; b. 104; c. Lamps, Television, and Walkman)** Students can count the types of appliances directly from the chart for (a). For (b), the total number of light bulbs in the chart is 26, and each stands for 4 appliances from the key, so the total is 104. Lamps is most popular with 5 light bulbs, followed by Television and Walkman with 4 each.

7. **(189, 180, 117)** The pattern involves subtracting 9 each time you move one term to the right.

Commentary
Jupiter, XIV

1. **(Charles was correct.)** The window "edges out" on the right hand side about half a square unit, and there are six of those square units on that side of the window. Therefore the area is 24 square units, plus the six extra half-squares, or 27 square units altogether. The picture is a little short of taking up the sixth square unit on the right-hand end. Measurement shows that it's about 1/5 of a square unit short on that side, and there are four such squares on that end. Therefore its area is four 1/5's short of being 24 square units. Charles desire to be an architect means that he will probably be quite exact in his measurements, as this problem shows.

2. **(32)** The 8 pigs were 1/4 of the total number of animals, since that is the amount left when 1/2 and 1/4 are combined and removed from 1. Then the total number of animals is 4 x 8 or 32.

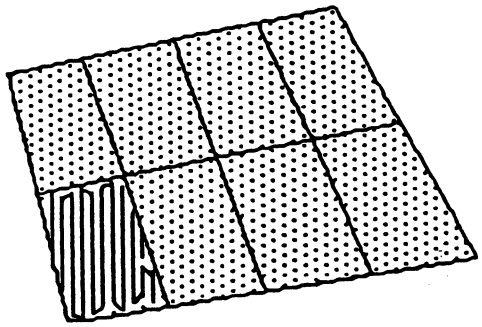
3. **(a. 15; b. 30; c. 50)** For (a),59 - 32 = 27; 27 + 9 = 3; 5 x 3 = 15. For (b), 86 - 32 = 54; 54 + 9 = 6; 6 x 5 = 30. For (c), 122 - 32 = 90; 90 + 9 = 10; 10 x 5 = 50.

4. **(140)** Students might get this by working backwards. To end up with 60 after multiplying by 5, you must have had 12 at the previous step. To have 12 after dividing by 9, you must have had 108 in the previous step. To have 108 after subtracting 32, you must have had 140 to begin.

5. **($4.25)** The 17 quarters would be $4.25.

6. **(a. 3/12 or 1/4 or 0.25 or 25%; b. 9/12 or 0.75 or 75%)** In (a), there are 3 months being considered out of twelve, so the chance is 3/12 you will get one of those. In (b), the chances are 9/12 since 9 months are being considered, out of 12.

7. **(c. 1000)** Students can partition the figure into smaller equal-sized pieces, count those, and gain an estimate by multiplying. The figure below has about 120 dots in the section that has been counted, and there are 8 such sections, resulting in 120 x 8 or 960 pots.



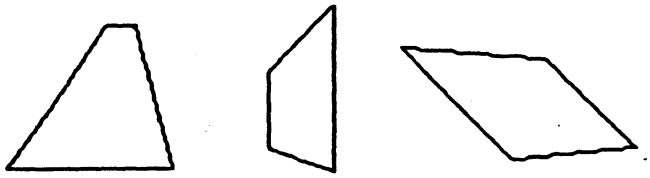
8. **(a. yes; b. yes; c. no; d. yes)** This problem will demonstrate that some students can translate a verbal situation into an equation, but others cannot.

Commentary

Jupiter, XV

1. **(a. 32; b. $160)** There are 10 faces on the side showing, giving 20 altogether on the two sides. There are 8 faces the make up the "steps," and 4 more on the end. The estimate of the cost can be made by rounding $4.99 to $5, and multiplying 32 x $5.

2. **(Any picture of a <u>trapezoid</u> is acceptable.)**

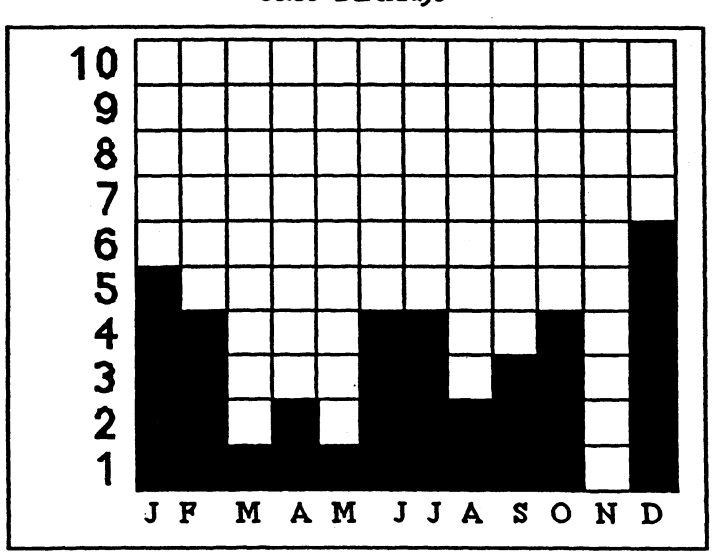


3. **(3)** One-half of a dozen is 6, and one-half of 6 is 3.

4. **(800)** Four out of five is the same ratio as eight out of ten, which is the same as 80 out of 100, which is the same as 800 out of 1000.

5. **(24; its factors are: 1,2,3,4,6,8,12,24)** Students will likely have to *guess-check-revise* to find the number with the most factors.

6. **(See the graph below.)** The title can be anything that makes good sense, such as "Class Birthdays." The labels on the bottom axis should represent the months of the year, probably with an initial.



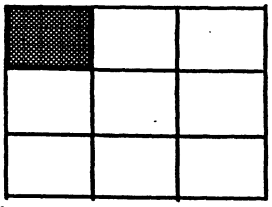
7. **(35)** Two hours is 120 minutes, and the 15-minute break means that 105 minutes are available for music. 105 ÷ 3 = 35.

8. **(9)** The perimeter of the square is 36 miles. So the four sides add to 36, meaning that each side must be 36 ÷ 4 = 9 miles in length.

Commentary

Jupiter, XVI

1. **(Any model with one shaded cell is correct.)** Students will likely think of dividing the rectangle into thirds either horizontally or vertically, and then one of those thirds into thirds going in the other direction.

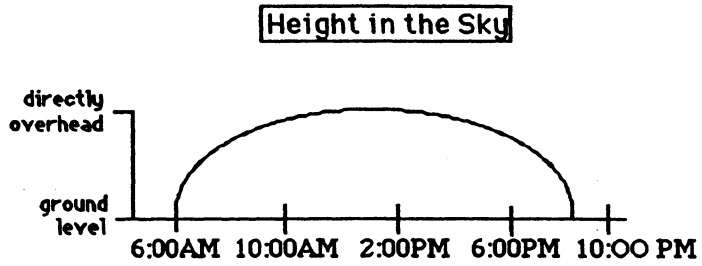


2. **(a. 71, 68, 69, 70, 67; b. Cincinnati; c. St. Louis; d. 69)** The total number of games comes from adding each teams wins and losses. Students can find the winning percentages by dividing the wins for each team by the losses. When rounded off to two decimal places, these percentages are: 0.43, 0.63; 0.55, 0.53, and 0.45 for the teams as listed, top to bottom, in the chart. The highest of these percentages is 0.63 and the lowest is 0.44, corresponding to Cincinnati and St. Louis, respectively. The average number of games played is (68 + 69 + 70 + 67 + 71) ÷ 5, or 69.

3. **(7)** There are 3 large squares, and 4 smaller ones in the center.

4. **($69.72)** The students first need to find how each item will cost on sale. They will probably divide the price of the dress by 2 to get the new price, $47.25. They will probably divide the price of the shoes by 4 to get $7.49, and subtract that from the regular price to get the sale price, $22.47. They then add these two sale prices. This is only one way a fourth grader might approach this problem.

5. **(See the graph below.)**



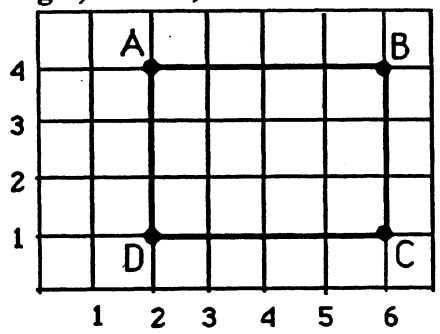
6. **(a. 10 out of 54, or 5 out of 27, which can also be written as a ratio, fraction, decimal or percent -- 10:54 or 10/54 or 0.19 or 19%; b. 13 out of 54, which can also be written as a ratio, fraction, decimal or percent -- 13:54 or 13/54 or 0.24 or 24%)** There are 10 brown M&M's out of 54 in the bag, which is a 10/54 chance of getting a brown one. There are 13 red or blue M&M's and no whites, so the chances of getting a color in the American flag is 13/54.

7. **($3)** Four packages of pencils cost about $4, two packages of paper cost about $2.00, and the eraser package costs about $1. This totals $7, so he would have $3 left out of $10.

Commentary

Jupiter, XVII

1. **(a. See below; b. rectangle; c. 12)**



2. **(150, 200)** Students can measure with a piece of paper and a pencil the distance from 100 to the second dot, and compare that to the distance from the second dot to 300. They will find the distance to be the same, which means the middle dot is half way between 100 and 300, or is 200. A similar strategy shows that the first open box holds 150.

3. **(61)** Students can divide: $671 \div 11 = 61$

4. **(a. hexagon; b. 6; c. obtuse)**

5. **(24 or 25)** Students can round 57 minutes to 60 minutes, which is one hour. There are 24 hours in a day, therefore an estimate of 24 fatalities per day is reasonable. If a student calculates that since 57 is 3 minutes less than 1 hour, there would be 24 x 3 or 72 extra unaccounted for minutes, meaning another group of 57 minutes in 24 hours, then 25 is a reasonable estimate also..

6. **(precise calculation, estimate)** Either answer might be acceptable in each situation, except the directions say to use each term once. Therefore the student is forced to choose the most likely term for each spot.

7. **(1, 3, 10, 15)**

8. **(The number pattern increases by adding one greater number to the total each time. See alternate formula below.)** $1 + 2 = 3$ (the next level); $3 + 3 = 6$ (the next level); $6 + 4 = 10$ (the next level); $10 + 5 = 15$; and so on. Most students won't notice this, but they can find each new number without knowing the previous number. If there are n small rectangles, then the total number of rectangles formed is $(n)(n + 1) + 2$.

9. **(28)** Following the lead from problem 8, the student can add 6 to 15 to get 21 rectangles with 6 small rectangles, then $7 + 21$ to get the next total. Or, with 7 small rectangles, there are $(7)(8) + 2$ total rectangles.

Commentary

Jupiter, XVIII

1. **(4 out of 52, 2 out of 26 or 1 out of 13, which could also be written as a fraction (4/52, e.g.), a decimal (approximately 0.08), or a percent (8%))** Out of each suit, there are two cards that are multiples of 5, the 5 and the 10. There are two red suits, diamonds and hearts. Therefore the are four such cards, out of 52 in the deck.

2. **(3/8)** The two pizzas shown have not been divided into eighths yet, as pizzas normally are. The student can divide them this way and see that Dad ate 6 pieces, Jenny ate 1 piece, Danny ate 2 pieces, and Mom ate 4 pieces. Therefore 13 pieces were eaten, leaving 3 pieces. Three pieces is 3/8 of a pizza.

3. **(15)** Students should solve this problem intuitively, not by trying to use the equation. The equation is there simply for them to associate an equation with a real-life situation. They can *guess-check-revise* to find the weight of an apple, or they can deduce the answer logically as they will be called on later to solve such equations. If three apples and 5 grams weigh 50 grams, then 3 apples by themselves must weigh 45 grams. Therefore each apple weighs 45 ÷ 3 or 15 grams.

4. **(26 students)** There is extra information in this problem -- 16 classes. The problem is solved by dividing 104 students by 4.

5. **(even)** Students might want to test this out, by opening a book to several different places and multiplying the numbers on the facing pages with a calculator.

6. **(a. $9.60; b. 2 hours and 40 minutes)** Students can first multiply each color string by 8, add those products to get 96 and multiply by 10 cents. Or, they might add all the colors together for one bracelet and get 12, and multiply that amount by 8, and then 10 cents. For the second question, students can multiply 20 minutes by 8 and get 160 minutes, and convert that to 2 hours and 40 minutes.

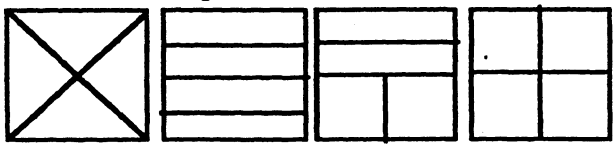
7. **(6 meters)** Students might estimate this amount visually -- the height of a door is about 2 meters, and the width is not quite 1 meter, so the distance around the outside would be about 1 + 2 + 1 + 2 or 6 meters. Some students might actually measure a door, and find approximately the same dimensions. Most interior doors in houses are about 5.5 meters around the outside, which is closer to 6 meters than any of the other answers.

8. **(11 hours 30 minutes)** The trip from Tallahassee takes the longest. Students will most likely "count up" from the departing time to the arrival time, getting 6 1/2 hours, 11 1/2 hours, 5 hours, and 8 hours, respectively. On the Tallahassee trip, some might get the time by realizing that a 12-hour trip would go from 7:30 AM to 7:30 PM, and this would be 1/2 hours shorter than that, giving 11 1/2 hours for the trip.

Commentary

Jupiter, XIX

1. **(Four possibilities are shown below.)** Students can show "fourths" in a number of ways. The square must be divided into 4 parts, and the parts must have the same area. However, the parts do not have to be the same shape.

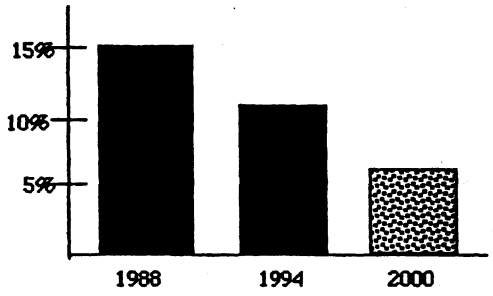


2. **(45)** Students might start by listing the numbers greater than 39 but less than 46: {40, 41, 42, 43, 44, and 45}. The only number of the list that you count when you count by threes and fives is 45. "It roared an odd number of times." is not necessary as a clue.

3. **(771)** Students might use a calculator to divide 3855 by 5, getting 771. Students might be challenged to find the approximate number of pushups per minute -- 13 -- and to then approximate the rate of his doing push ups (about 1 every 5 seconds).

4. **(square is 4 units; rectangle is 8 units)** Some students might misinterpret the problem and try to use all four figures to make the square, and then all four again to make the rectangle. They will find they can't make such a square.

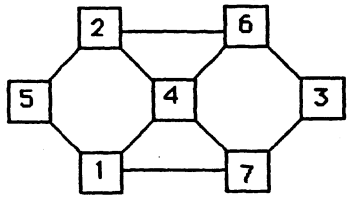
5. **(The graph should be approximately equivalent to the one shown.)** The change from 1988 to 1994 is from 15% to 11%. That same change from 1994 to 2000 would result in about 7% in 2000.



6. **(Figure B)** Students might find the drawing by tracing over figure A, and actually turning it three 90° turns, to match it up with one of the given drawings.

7. **(40 students)** This problem cab be solved by *working backward* and then adding. On Friday 12 students got the silly willies; therefore on Thursday, 10 students did; Wednesday, 8 did; Tuesday, 6 did; and Monday, 4 did. 12 + 10 + 8 + 6 + 4 = 40.

8. **(One solution is shown.)** Students might start by putting 4 in the center, and the two numbers that "surround" it, 3 and 5, on the ends.



Commentary

Jupiter, XX

1. **(112)** Students may make a chart according to the animal's number of legs. Dogs, cats, turtles, lizards and the pig have 4 legs each, so the total of 4-legged creatures is 4 x (5 + 4 + 2 + 2 + 1) or 4 x 14 = 56. The 12 birds contribute 24 legs and the 4 spiders have 8 legs each or 32 all together. Therefore there are 56 + 24 + 32 = 112 legs.

2. **(55 pounds, 8 oz)** Students need to convert 1 pound to 16 ounces in order to be able to subtract. The 68 pounds become 67 pounds, 16 ounces, and 12 pounds, 8 ounces is then subtracted.

3. **($6.25)** Students might multiply 12.5 x $0.50, or they might realize that every 2 pounds will cost $1, so 12 pounds will cost $6. They then realize that 1/2 pound will cost half of 50¢, or 25¢, and combine that with $6.

4. **(pages 88, 89)** Students may need to be reminded that pages in a book are consecutive. If they divide 177 by 2, they will get a hint that the answer must be 88 and 89.

5. **(4)** Drawing 1/2 dozen eggs, or 6 eggs, will lead to a solution. Then 1/3 of them, or 2 eggs, can be crossed out, leaving 4 eggs.

6. **(E and F should be circled.)** These two points are the only two with an odd number of paths going in and coming out. Consequently, these are the only two places where you can begin such a network, and trace it without backtracking.

7. **(15)** Students can make a chart or diagram to solve this problem, or a list such as the one below which uses A, B, C, D, E, and F to represent the six classrooms:

   AB, AC, AD, AE, AF, BC, BD, BE, BF, CD, CE, CF, DE, DF, EF

8. **(a. 57; b. 8; c. 29)** For part (a) students add 7, 13, 29, and 8. For (b), they look for the number common to both pizza and hot dogs, but is not common to tacos. For (c), the students locate the number common to all three rectangles.

Commentary

Jupiter, XXI

1. **(a. 6th and 12th; b. 1st, 5th, 7th, and 11th)** Students can draw the 12 steps, and the two animals jumping, as a concrete way to solve the problem. Or they might simply list the steps that each will land on and find the answer that way. Some might write the numbers from 1 to 12, and write "C" or "F" above each number is the cricket or flea lands on it.

2. **($230)** This will probably be a two step problem. Students will probably divide 92 by 2 and then multiply that quotient by 5.

3. **($230,000,000.00 or $230,000,000)** In this answer, look for the dollar sign and the correct number of zeros.

4. **(a. drier; b. 2.76; c. 67)** Part (a) simply involves comparing the 1995 bar with the "normal" bar. Part (b) involves subtracting 1.43 from 4.19; part (c) requires students to subtract 1928 from 1995.

5. **(118)** Students may draw a picture; there are 10 bricks (10 x 10 cm = 100 cm) and 9 sections of mortar (9 x 2 cm = 18 cm). The total is then 100 cm + 18 cm.

6. **(more than)** The total number of calories listed is 2217. Some students will be able to estimate accurately that the calories sum to more than 2000, without actually getting the total number of calories accurately.

7. **(6)** Out of the 36 ways the dice can land, these ways give a sum of 7: (1,6), (6,1), (2,5), (5,2), (3,4), (4,3).

8. **(b. 25 million)** Students can convert 25,000 miles into 132,000,000 feet using a calculator. If the average person is 5.5 feet tall, this number can be divided into 132,000,000 to get 24 million people necessary. An average height of 5 feet would result in a little more than 26 million people. Therefore the most reasonable answer is about 25 million.

Commentary

Jupiter, XXII

1. **(Tuesday)** Students can use a calendar or make a chart with "Su, M, T, W, Th, F, Sa" at the top, and begin numbering backward with 24 under Saturday.

2. **(8)** Students can solve this problem by drawing a diagram or by visualizing 24 colas. 1/2 of 24 is 12, and 1/3 of 12 is 4. Therefore Chris gave away 4 sodas of the 12, leaving 8.

3. **(65)** Students will probably solve this by first finding the total weight of the 12 girls: 12 x 55 = 660 pounds. Then they will compute 1050 - 660 = 390 pounds, the weight of the 6 boys. Computing 390 ÷ 6 = 65 pounds per boy.

4. **(91, 92, 93)** Students may use the *guess-check-revise* method. Some students might know that the numbers they seek are about 1/3 of the total, and approximate the numbers by dividing 276 by 3. This gives 92, which is the middle number.

5. **(48)** Students may want to draw a picture to help solve this problem. Spiders have 8 legs, which would be 4 pairs of shoes per spider.

6. **(29 hours and 45 minutes)** Most students will realize that from 8:45 AM to 8:45 AM the next day, is 24 hours. They will then "add on" 5 additional hours to get to 9:45, 10:45, 11:45, 12:45, and 1:45, and then 45 minutes to get to 2:30 PM.

7. **(27)** There would be 12 wheels on the 3 cars, 8 on the 4 bicycles, 6 on the 2 tricycles, and 1 on the unicycle.

8. **($1.84)** Students will probably add $6.98 and $9.99 to get $16.97, then add the tax of $1.19 to get $18.16. They will subtract this amount from $20.

9. **(a. C; b. D; c. G)** Hopefully students will notice that the multiples of 7 are in column A, and use this fact to get "close to" the numbers 100, 500, and 1,000. Ninety-eight (14 x 7) is the closest multiple of 7 less than 100, so 98 would be in column A, forcing 100 to be in column C. Likewise, 497 or 71 x 7 is in column A, giving that 500 is in column D. Finally, 994 or 142 x 7 is in A, indicating that 1000 is in column G.

Commentary

Jupiter, XXIII

1. **(3rd from the left is circled.)** Students with good spatial visualization can find the right card by imagining the turns. Others might draw the figure on a card or sheet of paper, and make the turns.

2. **(296 pounds)** 310 - 14 = 296.

3. **(6)** One way to begin the problem is to write down the room numbers 12, 14, and 16, and *guess-check-revise*. If there are 2 friends in each room, then there will always be four friends in the other two rooms.

4. **(7 kids, 4 boys and 3 girls)** Sam and Suzie are included in the number of brothers or sisters. One way to begin is to write list "B" and "G" for boys and girls, and *guess-check-revise*. The number under B must be more than 1 since Sam has at least one brother, making 2 boys at least. So try 2 for B, which means Sam has 1 sister, giving Suzie 0 sisters. But this contradicts what is given, so revise the guess under B to 3. This gives Sam 2 brothers and 2 sisters, and Suzie 1 sister. But then Suzie has 3 brothers, which is not twice as many as her 1 sister. Revise the guess under B to 4, giving Sam 3 brothers and 3 sisters, and Suzie 2 sisters and 4 brothers. This meets the conditions of the problem.

5. **($8.78)** He spent a total of $47.87 plus $3.35 in tax. This totals $51.22. Subtract $51.22 from $60.00.

6. **(a. 6; b.**

Age Group	% Participation ;
7-11	40%
12-17	37%
18-24	10%
25-34	9%
35-up	4%

c. The older you get, the less likely you are to be in roller hockey.)

7. **(74)** Students can use the second clue and the last clue to list the numbers from 71 to 79. The first clue eliminates the odd numbers, leaving 72, 74, 76, and 78. But 72 and 76 are both divisible by 4, and 78 is divisible by 3. Hence by process of elimination, 74 is the answer.

8. **(8)** Students should try to find the weight of a book without manipulating the variable x in the equation. They can reason that the 4 books alone must contribute 32 ounces to the weight on the left, since those books plus 5 ounces weigh 37 ounces. Then if 4 books weigh 32 ounces, each book must be 8 ounces.

Commentary

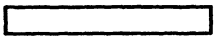
Jupiter, XXIV

1. **($2.25)** Four weeks at a daily rate would be $0.35 x 5 x 4 = $7.00. A 4-week subscription is $4.75. $7.00 - $4.75 is $2.25.

2. **(>)** 1/2 + 3/4 is 5/4 or 1 1/4. 2/3 + 1/2 is 4/6 + 3/6 or 7/6, or 1 1/6. 1 1/4 is greater than 1 1/6 since 1/4 is greater than 1/6. Some students will get the answer by focusing on 3/4 and 2/3 -- since 1/2 is part of each side, it can be ignored. 3/4 > 2/3, so 1/2 + 3/4 must be greater than 1/2 + 2/3.

3. **(130,000)** 354 x 365 = 129,210. When rounded to the nearest ten thousand, the answer is 130,000.

4. **(18)** Students need to drawn figures and look for rectangles of different sizes.

   If,  = 1 unit, then

   # of 1 unit rectangles = 6
   # of 2 unit rectangles = 7
   # of 3 unit rectangles = 2
   # of 4 unit rectangles = 2
   # of 6 unit rectangles = 1
   18 total

5. **(1 week 3 days 17 hours 50 minutes)** This problem involves "borrowing" in a non-base ten system. The time "4 weeks, 3 days, 13 hours, 21 minutes" can be rewritten as "3 weeks, 9 days, 36 hours, 81 minutes" so that the lower number can be subtracted.

6. **(18 and 17)** Students can find the answer by making a list of pairs of numbers that sum to 35, and comparing the products of those pairs. They will notice that the closer the numbers in the pairs become to each other, the higher the product.

7. **(P)** The pattern is not a numerical pattern, which will confuse some students. *M V E M J S U N P* represents the first letter of each of the planets in our solar system, in order of their position from the sun -- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Many adults memorized a saying such as "My very educated mother just served us nine pickles" to remember this sequence.

8. **(15, 21, 28, 36)** Students may make a drawing of the next four triangular numbers, and count the dots. They will notice that each new figure in the pattern adds a row on the bottom, with one more dot in it than the previous figure.

9. **(a. about 25%; b. AB^-; c. O^-)** For part (a), students can turn the graph and readily see that A^+ is about 1/4 or 25%. The most rare type is the one with the smallest area -- careful observation, or perhaps tracing the regions of each and comparing the tracing, shows that AB^- is slightly smaller than AB^+. For (c), AB^+ is smaller than O^-, so the chances of O^- are greater.

Commentary

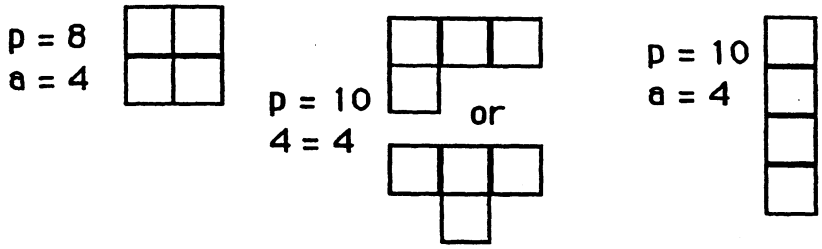
Jupiter, XXV

1. **(59,049)** Students may make a list to find a pattern. The pattern is increasing each clap by multiplying the previous distance by 3. This is also 3^{10}, which can be computed quickly on a calculator with a repeating function by this process:

claps - km	claps - km
1 - 3	6 - 729
2 - 9	7 - 2,187
3 - 27	8 - 6,561
4 - 81	9 - 19,683
5 - 243	10 - 59,049

2. **(4)** Pages 47 and 48 are back-to-back, but 20, 21, and 104 are all individual pages.

3. **(There are 3 basic ways to arrange the tiles, as below.)** Students can draw the three basic configurations and count to find the perimeter -- the area is always 4, since 4 tiles are used. One basic configuration is a square, another is 3 tiles together and another one on the side somewhere, and the third is 4 tiles in a row. Students will likely have other arrangements of these three basic shapes.



4. **(6)** Students can use the first initials and make a list: TJC, TCJ, CJT, CTJ, JCT, JTC

5. **(11 cherries)** Students may draw pictures or use letters. From the right-hand scale, we know that a piece of cake and 5 cherries can be substituted for an apple because they weigh the same. Therefore a piece of cake and 5 cherries can replace the apple in the right-hand pan of the left-hand scale. Therefore 2 pieces of cake balance 1 piece of cake and 6 cherries. One piece of cake is removed from both sides of this scale, leaving 1 piece of cake balancing 6 cherries. This means that 6 cherries can replace the piece of cake on the right-hand pan of the right-hand scale, leaving 1 apple to balance 6 + 5 or 11 cherries. There are other ways to reach this same conclusion. Such problems are important foundations for later work with algebra.

6. **(2, 4, 6, 8, 12, 14, 16, and 18 in left area; 10 and 20 in intersection; 5, 15, 25, 30, 35, 40, 45, and 50 in right area.)** A Venn diagram is a way to show visually the intersection of two sets. The intersection contains elements common to both sets.

7. **(7 and 12)** Students may use trial and error with addends or factor pairs. Some may begin the problem by listing the numbers that add to 19, and checking to see if their product is 84.

8. **($1.80)** 1/6 of 18 is 3 quarters or $0.75; 1/3 of 18 is 6 dimes or $0.60 and 1/2 of 18 is 9 nickels or $0.45. Students might want to draw 18 coins, and physically circle 1/3, 1/6, and 1/2 of the set.

Florida Department of Education