Commentary

Venus, I

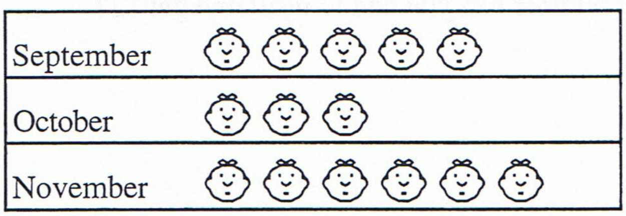
1. **(7)** 15 – 8 = 7. Students might use cubes to represent the strawberries. Making up a story to go with the problem might help some students who have trouble. They are likely to solve the problem by *counting on*.

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

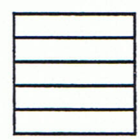
3. **(12)** 1st week-2 books, 2nd week-4 books, etc....6th week-12 books. Students who simply add or subtract the two numbers they see in the problem will need to act this out, with real books and a calendar.

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

5.



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



Commentary

Venus, II

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

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

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

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

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

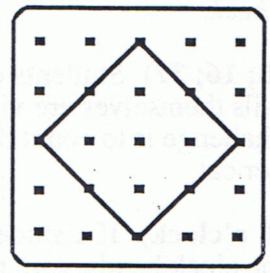
6. **(6)** Most students can *guess and check* to find the mystery number. They would perhaps guess it was 5, then go through the steps and find that 5 was too small because you don't get 14. So they would revise their guess up. *Working backwards* might be appropriate for some students. For them, you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

Commentary

Venus, III

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

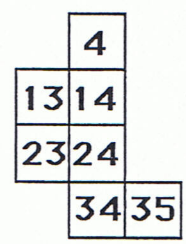
2. **(See the square to the right)** Students need to see geometric figures that are not in the usual orientation. They need to know that figures remain the same -- squares, triangles, and so on -- when they are rotated.



3. **(1)** Students will enjoy making their own survey similar to this one, and discussing the data. After they do so, this problem will be easy for them.

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

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



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

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

Commentary

Venus, IV

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

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

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

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

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

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

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

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

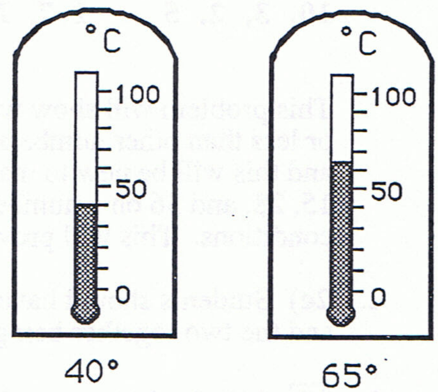
Commentary

Venus, V

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

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

   (Don't expect the children's marks on the thermometer to be precise.)



3. Students can *guess and check* with + and - to find the answer. Or, they might notice that + had to precede 6 since it's impossible to add the three previous numbers, subtract 6, and get 11. So the three numbers before 6 must turn out to be 5, once the computation is done for them. This makes the problem simpler.

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

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

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

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

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

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

Commentary

Venus, VI

1.

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

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

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

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

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

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

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

Commentary

Venus, VII

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

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

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

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

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

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

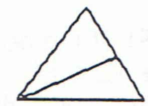
$$13 \ominus 4 \oplus 8 = 17$$

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

Commentary

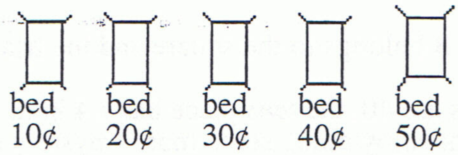
Venus, VIII

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



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

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



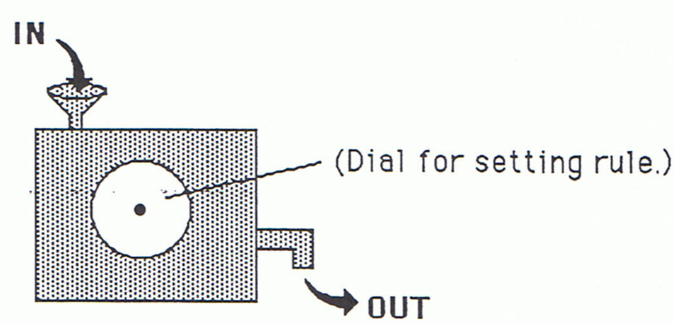
4. **(4)** Students could write all the numbers from 1 to 40, and select those with a 7. Some will be able to do this problem mentally, by thinking 7, 17, 27, 37, perhaps by counting out loud.

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

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

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

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

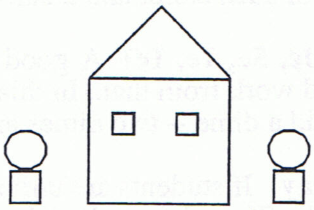


Commentary

Venus, IX

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

   Students might practice this problem with a different shape, such as the house and two bushes to the right.



2. **(20 or 21 cm)** Students will solve this in different ways. Some will count by ones from 4 (or perhaps 4 1/2), up to 25. Some might count by ones, but start at 25 and work down to the other end, 4. Others will mark the length of the tape dispenser on a piece of paper or another object, and hold that distance up to zero on the scale and read the other end. Others will count backwards (25, 24, 23, ...) down to 4, but then they won't know the answer unless they know how many times they counted. A few might subtract 4 from 25.
3. **(9, 11)** Students might practice making patterns like these out of tiles, cubes, or other manipulatives. A prompt might be to ask students having difficulty with such problems -- how do you get from step 1 to step 2? How do you get from step 2 to step 3? This will encourage them to relate each figure to the one which immediately follows or precedes it. Students who are unfamiliar with patterns might have trouble focusing on the parts of the pattern, and be looking globally at the design.
4. **(19)** Students might *guess-check-revise* for this problem. That is, they might try a number like 10 to start, and see if they get 13 after subtracting 6. They then revise their guess of 10 accordingly.
5. **(3)** To balance the scale, the student has to draw three apples on the right side of the scale. A key to solving such problems is some familiarity with balance scales in the classroom, knowing that the same weight must be on both pans for the bar to be horizontal. This model is important for later work with Superstars as a balanced scale is a physical embodiment of the way the equals sign is used in mathematics.
6. **(4)** Students will approach this problem in different ways. Some will count out individual pieces one at a time for the 4 kids, till all are gone. Others will divide each pizza into four equal parts, so each kid will get 2 pieces from each pizza for a total of four. Still others might think initially that 2 kids can share both pizzas, and cut each pizza in half and thus give 4 adjoining pieces to each kid.
7. **(48, 46, 45, 86, 85, 84, 65, 68, 64, 56, 58, 54)** Students might practice this problem with only 3 cards first, and different numbers than the four given.

Commentary

Venus, X

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

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

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

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

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

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

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

Commentary

Venus, XI

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

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

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

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

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

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

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

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

Commentary

Venus, XII

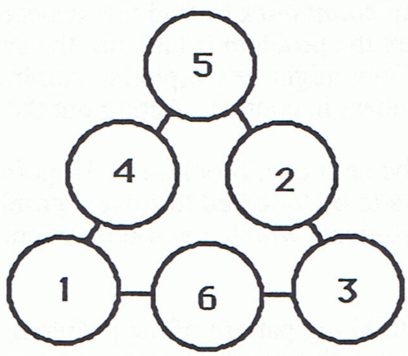
1. **(scissors, phone)** The pattern is repeated after every third term. The 10th figure is called for because it is the next one not shown. The 14th term is then called for, as this encourages students to predict "down the line" what might appear. Students will enjoy making their own such patterns,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

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

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

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

5. **(One solution shown below.)** Try a *guess and check* strategy. Try 6 numbers in different places until you find the combination that works. Be sure the sum along each side is 6. A hint might be that the 5 and 6 need to be "separated."



6. **(2, 2; 4,3; 4,0)** This problem is an introduction to the Cartesian Coordinate system. It is important that students remember to go <u>east</u> first, then north. Although this is merely a convention, it is an important one to keep in mind.

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

Commentary

Venus, XIII

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

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

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

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

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

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

Commentary

Venus, XIV

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

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

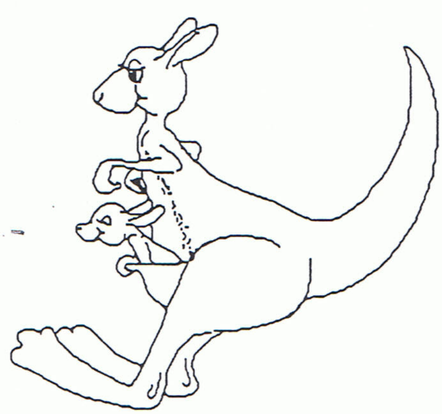
3. **(7¢)** The problem involves the concepts of *greater than* and *less than*, in one problem. In this case, the words are used naturally with coins and should be more meaningful to students than if the words were used simply with numbers. Similar problems used in the classroom will develop this skill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

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

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

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

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



Commentary

Venus, XV

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

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

3. **(Out: 4; Out: 8; In: 27)** Students are introduced to a function machine in this problem. They will enjoy having a machine like this in class, made from an old box with a plastic lid for a dial and a funnel for the "In" chute, and pretending to "set the dial" for each other, filling in a chart to see who can guess what the dial is set to do. In the first two parts of this chart, they subtract 7 from the input number. In the last entry, they must decide what the input number is, for the output of 20.

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

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

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

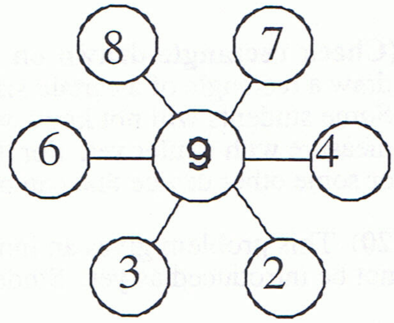
7. **(5:30)** The problem involves *process of elimination*. The first and second clues eliminate 4:00 and 6:00 o'clock respectively. The last clue eliminates 5:00, leaving 5:30 as the correct answer.

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

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

Commentary

Venus, XVI



1. **(One solution shown to the right.)** The numbers may appear on the array in a different position. Students will likely solve this simply by guess-check-revise. A few might notice that, since 9 already shows for each line, the other two entries on a line must total 10. So 8 can be matched with 2, 6 with 4, and 3 with 7.

2. **(Jan 10, 4, Jan 23)** Students should be familiar with a calendar by this point in the first grade. They have likely played games similar to the questions asked, alternating roles with other students to ask the questions. In a previous *Superstars III* activity, students were asked to actually place the numbers on such a calendar.

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

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

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

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

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

Commentary

Venus, XVII

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

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

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

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

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

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

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

Commentary

Venus, XVIII

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

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

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

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

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

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

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

Commentary

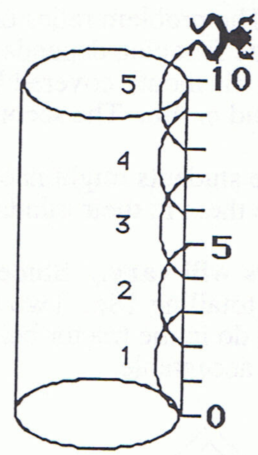
Venus, XIX

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

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

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

4. **(5)** The problem is an excellent one for which to draw a diagram. Such a diagram is shown to the right.



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

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

Commentary

Venus, XX

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

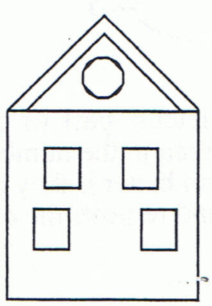
2. **(4)** Students might use 3 identical physical objects to represent the apples, and 12 identical cubes or other objects to represent the weights. Their problem is then to divide the 12 cubes fairly so that each apple has the same number of cubes.

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

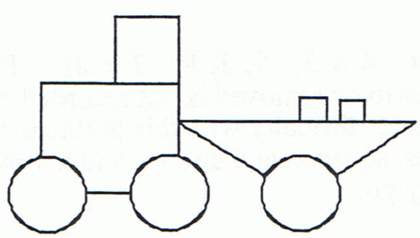
4. **(2nd)** The problem uses visual clues and process of elimination to determine Pete's position in line. The problem relies on students being familiar with "See no evil, hear no evil, speak no evil." The first clue depends on a student knowing that the "friend that speaks no evil" is the one with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

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

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



House



Tractor and wagon