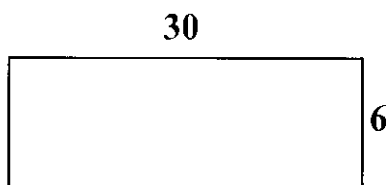# MathStars

★ ★ ★ 1. How many 2's must be multipled together for the product to be a number between 100 and 200?

Answer: _____
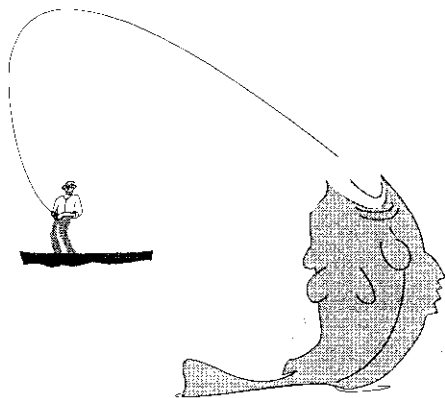
★ ★ 2. How many 2 x 5 tiles are needed to cover this floor?

30

6

Answer: _____

★ ★ 3. At 9:00 a.m., I went to the Ol' Fishin' Hole to fish. There is a three fish per hour limit. If I need 20 fish for a cook-out tomorrow, at what time will I probably have my 20 fish?

Answer: _____

★ ★ ★ 4. Mary has three skirts, two blouses, and either black or white shoes that she likes to wear to school. How many days can she go without repeating the same combination of skirt, blouse, and shoes?

Answer: _____

Strategy of the Month

Someone said, "A picture is worth a thousand words." Turning the words of a problem into a picture or a diagram can help you "see" the problem. By using the part of your brain that visualizes a situation or object, you may see relationships or information that helps you solve the problem. When someone tells you a story, try turning the words into a motion picture or a cartoon. When reading a description, try "seeing it in your mind's eye." If you can do these things, this strategy may be for you! Try using a picture or make a diagram to solve this problem:

In the restaurant there are 12 square tables. Only one person can sit on each side. What is the greatest number of people that can be seated if the tables are pushed end to end into one large rectangle?

★★★ 5. How many cubes do you think it will take to make a cube that is twice as high as one cube?
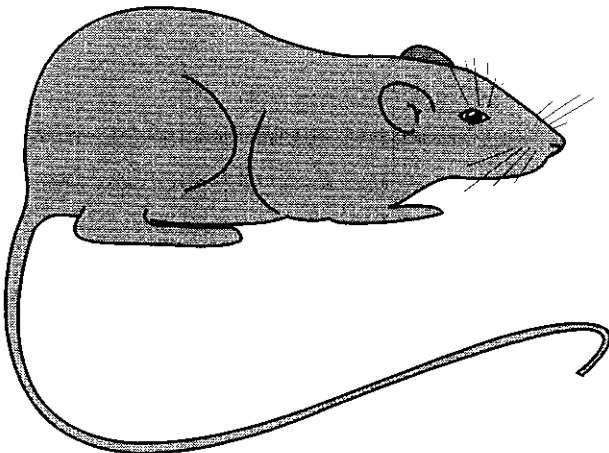
Answer: _____

Three times as high?

Answer: _____

Four times as high?

Answer: _____

★★ 6. If a cat catches seven mice in four days, how many mice should it catch in 16 days?

Answer: _____

★★★★ 7. At the end of the soccer tournament, each team captain shakes hands with every other team captain. If there were eight teams in the tournament, how many handshakes were there?

Answer: _____

★ 8.

$$\begin{array}{r} 432 \\ \times \quad ? \\ \hline 4752 \end{array}$$

? = _____

★★ 9. Julia spent 1/3 of her birthday money. Then she lost 1/2 of the rest. She now has $10 left. How much did she get for her birthday?

Answer: _____

★ 1. RIDDLE ME THIS:
I'm thinking of a number.
It is odd.
It's between 1 and 100.
It's higher than 20.
It is smaller than the answer to 6 x 6.
It is a multiple of 5.
The sum of its digits is 7.

Answer: _____

★★★ 2. Hank had an average of exactly 84% after taking two tests. On the third test, he scored 96%. Find his average for all three tests.

Answer: _____

★★★ 3. What day of the week was yesterday, if five days before the day after tomorrow was Wednesday?

Answer: _____

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

★★ 5. Complete the following number pattern:

14 28 18 36 26 52 42 84 ___ ___ ___

Answer: _____

★★ 6. You know that the perimeter of a certain rectangle measures 22 in. If its length and width each measure a whole number of inches, how many different areas (in square inches) are possible for this rectangle?

Answer: _____

Strategy of the Month

*Your brain is an organizer. It organizes information as it stores that information. When a problem involves many pieces of information, your brain will have an easier time sorting through it if you make an organized list. A list helps you be sure you have thought of all of the possibilities without repeating any of them. Like drawing a picture or making a diagram, making an organized list helps your brain "see" the problem clearly and find a solution. Try **making an organized list** to solve this problem:*

Tickets for the concert cost $12 for adults or teenagers and $6 for children. If the group has $60, how many adults or teenagers and how many children could go?

★ ★ ★ ★ 6. Each salad contains red beans, lima beans, and black-eyed peas. Use the information below and determine how many of each of the three types of beans are needed.

a. This salad contains at least 12 beans. It has one more lima bean than red beans. It has one more red bean than black-eyed peas.

b. This salad contains the same number of red and lima beans. It has three more black-eyed peas than red beans. It has a total of 18 beans.

c. Lima beans make up 1/2 of this salad. The salad has exactly two red beans. The number of lima beans is double the red beans.

★ ★ ★ 7. Suppose two hens lay three eggs in four days. At the same rate, how long will it take eight hens to lay a dozen eggs?

Answer: _____
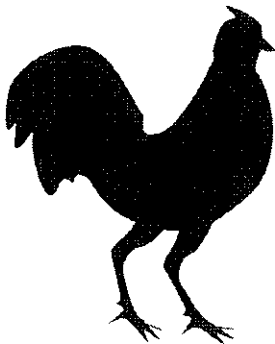
★ ★ ★ 8. The sale is 1/4 off the marked price. How much will you pay for this soccer ball, including tax of $.05 per dollar?

Answer: _____

$ 20.00
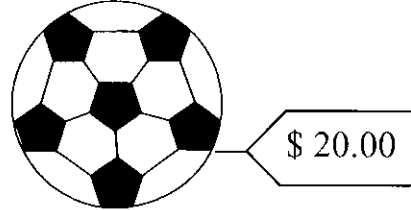
★ ★ ★ 9. Sam's father gave him 49 dog biscuits to give to their three dogs – Alice, Joe, and Mickey. Sam must divide the biscuits according to the size of the dogs. Joe needs to get twice as much as Alice and Mickey needs to get twice as much as Joe. How many biscuits should Sam give each dog?

Answers:

Alice: _____   Joe: _____   Mickey: _____

★ 1. The length of one side of a regular hexagon is 20 cm. What is the perimeter of the hexagon?

Answer: _____

★ ★ ★ ★ 2. Given the number line below, express in fractional form the relationship between:

A   B   C   D   E
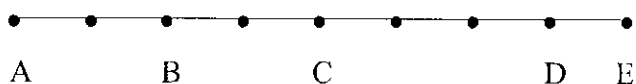
$\overline{AB}$ is what fractional part of $\overline{AD}$? _____

$\overline{AC}$ is what fractional part of $\overline{AD}$? _____

The length of $\overline{AB}$ is what percent of the length of $\overline{AE}$? _____

The length of $\overline{AB}$ is what percent of the length of $\overline{AC}$? _____

★ ★ ★ 3. A bag of marbles can be divided in equal shares among 2, 3, 4, 5, or 6 friends. What is the least number of marbles that the bag could contain?

Answer: _____

★ ★ ★ 4. Look at the picture below. Can the mouse reach its hole before the cat can catch it?

Answer: _____

Mouse runs 10 meters per second

Cat runs 20 meters per second
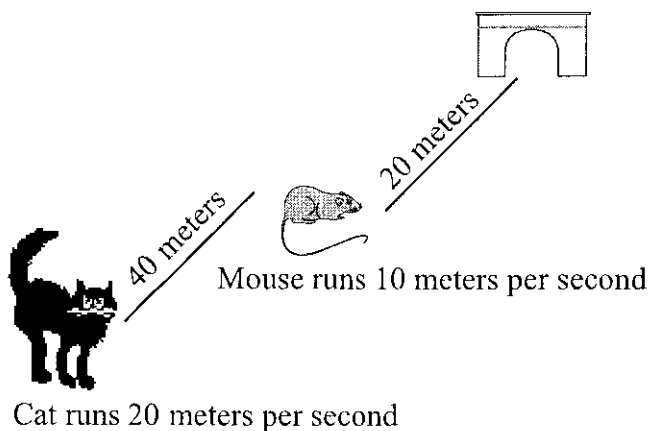
Strategy of the Month

Being a problem solver is something like being a detective! A detective has to solve crimes by guessing what happened and checking the guess to see if it fits the situation. For some problems, your best strategy may be to make a guess and then check to see if your answer fits the problem. If not, decide if your guess was too high or too low and then make a second "guesstimate." A good detective keeps records (usually some kind of chart) to help see any patterns and to narrow down the possibilities. You should do this too. The results of incorrect guesses can give you valuable clues to the correct solution. **Guess and then check** *the solution to this problem:*

Use exactly 50 coins to make one dollar. You must have at least one penny, one nickel, one dime, and one quarter.

★ ★ ★ 5. Michael was supposed to multiply a number by 5. By mistake, he divided the number by 5 instead. His answer was 5. What should have been the correct answer?

Answer: _____

★ ★ 6. The fifth grade is going on a field trip to the zoo. The zoo requires that for every 15 students, there must be one chaperon. If there are 194 students going on the trip, how many chaperones will be needed?
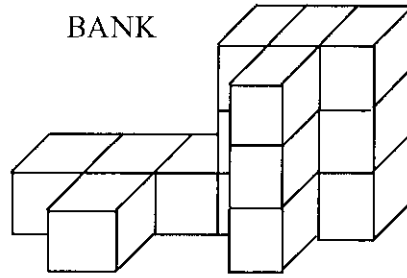
Answer: _____

★ ★ ★ 7. Find the volume for each building.
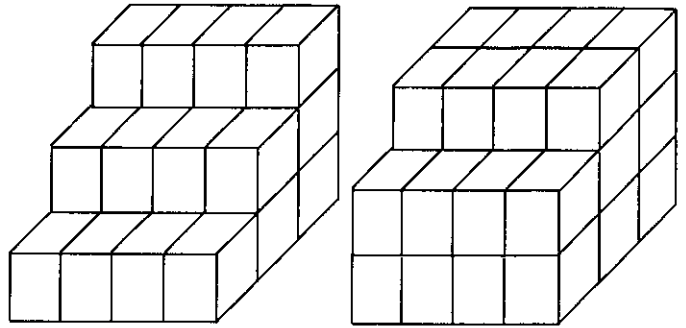
BANK   OFFICE

HOSPITAL

Bank _____

Hospital _____

Office _____

★ ★ 8. What is the greatest six-digit number in which the thousands place is twice the digit in the tens place? What is the least number?

Answer:

Greatest number _____

Least number _____

★ ★ ★ 1. Use the numbers 4 through 12 to fill in the circles. The numbers on each straight line must add up to 21.
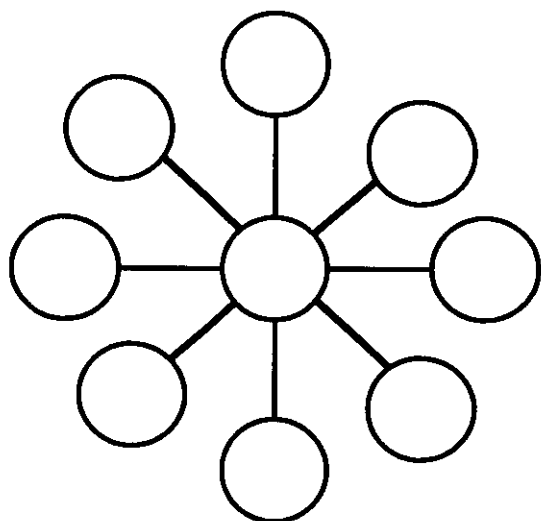
★ ★ ★ ★ 3. A rectangle lot 30m by 20m is surrounded on all four sides by a concrete walk 3m wide. If you need to concrete only the sidewalk, how much concrete will you need? (surface area)

Answer: _____
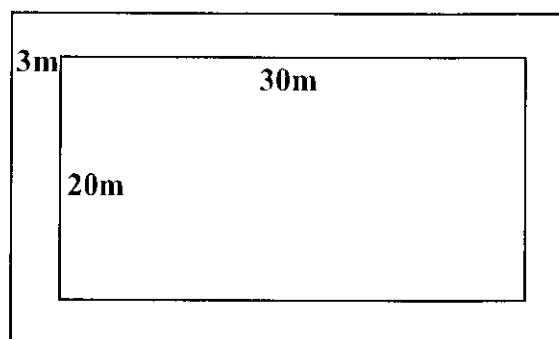
★ ★ 2. Your mother and father decide to change your allowance. You are given the choice:

a. They will pay you $10 a week
- or-
b. They will pay you one cent the first week, two cents the second week, four cents the next week, and so on, doubling your allowance each week for a year.

Which will give you the most money?

_____

Why?

Strategy of the Month

*Noticing patterns helps people solve problems at home, at work, and especially in math class! Math has been called "the study of patterns," so it makes sense to look for a pattern when you are trying to solve a problem. Recognizing patterns helps you to see how things are organized and to make predictions. If you think you see a pattern, try several examples to see if using the pattern will fit the problem situation. Looking for patterns is helpful to use along with other strategies such as make a list or guess and check. How can **finding a pattern** help you solve this problem?*
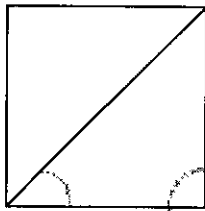
A palindromic number is one which reads the same backwards as forwards. How many 3-digit palindromic numbers are there?

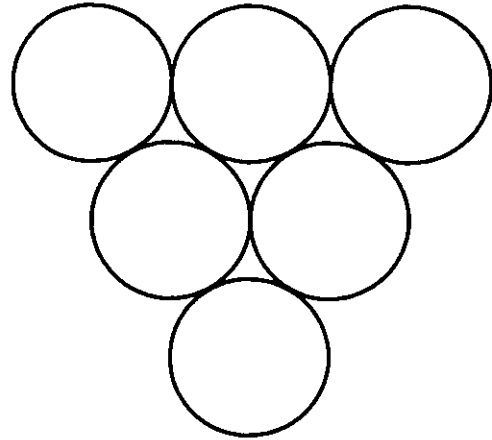★ 4. Label the correct measurements on the marked angles in the square.

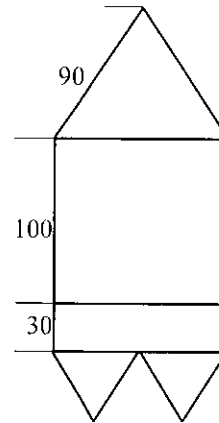★ ★ 5. What are the two least likely sums to be rolled on two regular dice? Why?

Answer: _____

★ ★ 6. Move only two discs and turn the triangle upside down. (Draw arrows to show how to move them.)

★ ★ ★ 7. The figure below is constructed of equilateral triangles and rectangles. Label the ten unmarked segments with their correct lengths.

90

100

30

MathStars

★★ 1. If $x = 4$ and $y = 2$, then:

$3x + y = $ _____ and

$4y - 2x = $ _____

★★ 2. Graph the factors of 45 and 54 in the Venn diagram below.
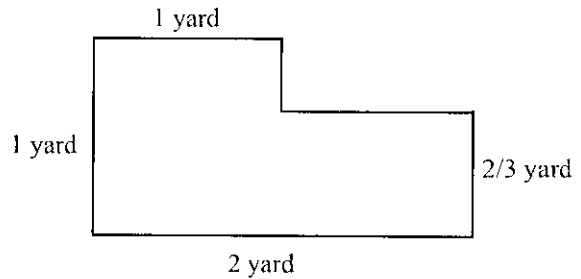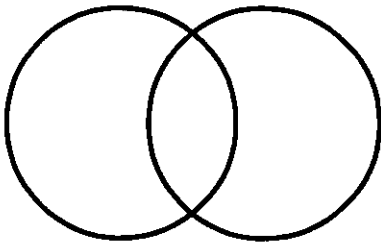
★★ 3. If there are two computers for every 40 students at Elm Elementary, how many computers do they have for the 440 students attending school?

Answer: _____

★★ 4. Write a number in the triangle that will make the answer 50.

△ ➔ X4 ➔ ÷2 ➔ +6 = 50

★★★ 5. Find the area of the flower bed below in square feet.

Answer: _____

1 yard

1 yard

2/3 yard

2 yard
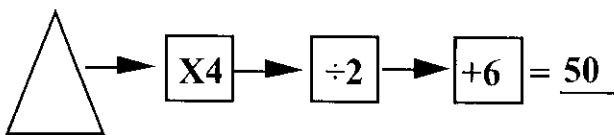
Strategy of the Month

*Sometimes mathematical ideas are hard to think about without something to look at or to move around. Drawing a picture or using objects or models helps your brain "see" the details, organize the information, and carry out the action in the problem. Beans, pennies, tooth-picks, pebbles, or cubes are good manipulatives to help you model a problem. You can use objects as you guess and check or look for patterns. Try **using objects** to help you solve this problem:*

What happens to the volume of a rectangular prism if the width is tripled?

★ ★ ★ 7. On one night, 30 fifth graders gathered to study mathematics and science. Of these students, 11 studied math, 15 studied science, and 3 studied math and science. How many students of the group studied neither math nor science?

Answer: _____

★ ★ ★ 8. If you cut a cylinder along the dotted line and flatten it, the inside forms what shape?
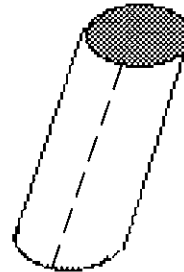
Answer: _____

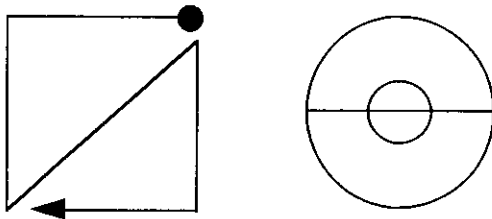If the area of the flattened figure is 20 square inches and the distance around the top of the cylinder is 4", how tall is the tube?

Answer: _____

★ ★ ★ ★ 6. All of these are snobhops:

None of these are snobhops:

What is my rule: _____

Draw another snobhop:

★   9. There are 20 chickens, 4 horses, and 8 cows on the McDonald farm. How many legs are there?

Answer: _____

MathStars

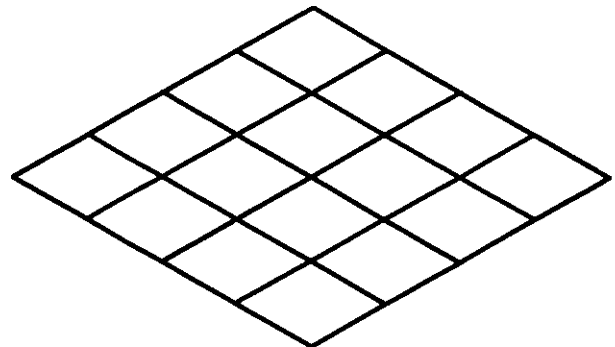★　　1. The square below can be traced with one continuous line without lifting a pencil or retracing a line. Find the correct path for the circle.

★★★★2. Juan received the following grades for the first grading period:

6	8, 8
7	1, 7, 7
8	3, 5, 7, 8
9	5, 9, 9, 9

Should Juan request that the teacher use the mean or median to determine his grade, if he has a choice? Why?

Answer: _____

★★　　3. Using Roman numerals made from toothpicks, move one toothpick to make a true equation.

★★　　4. Create a pattern using green, black, red, and yellow so that each color appears only once in every line of four diamonds.
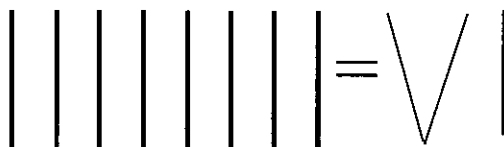
Strategy of the Month

*When a problem involves data with more than one characteristic, **making a table, chart, or graph** is a very good way to organize the information. It helps your brain to identify patterns and to discover any missing data. Tables help you record data without repeating yourself. Making a table or chart is especially useful for certain problems about probability and for some logic problems. Sometimes tables and charts are included in your information and you need to read through them carefully to understand the data you need to solve your problem. Creating a graph is also a good way to organize and visualize information. Make a table to solve this problem:*

Farmer Oakes had 15 animals in her farmyard. Some were chickens and some were cows. There were 52 legs in all. How many cows were in her farmyard?

★★ 5. Arrange the digits 4, 8, 7, 2, and 9 such that the answer will be the largest possible product.

```
 ┌──┬──┬──┐
 │  │  │  │
 ├──┼──┼──┤
X│  │  │  │
 └──┴──┴──┘
─────────────
```
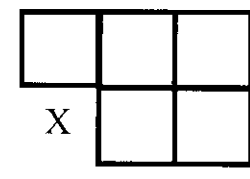
Answer: _____

★★ 6. RIDDLE ME THIS:

I am > 5 x 10.
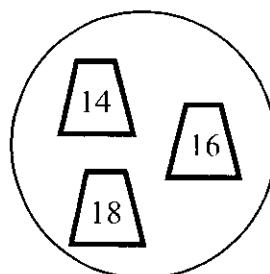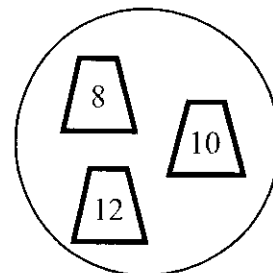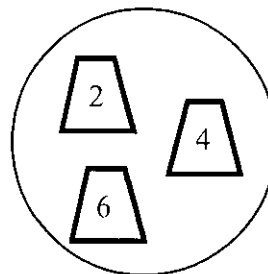I am < 100.
I am an even number.
I am not 70 or less.
I am a multiple of 4.
I am a multiple of 3.
I am < 80.

Answer: _____

★★ 7. Even up the weights in these circles by moving one weight to another circle. The sum of the weights in each circle should be equal.
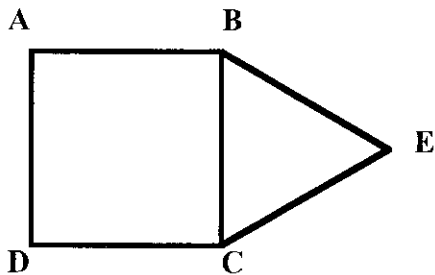

★★★ 8. Five flags are evenly placed around a track. It took a runner 30 seconds to get from the first flag to the third flag. If the runner continues at the same speed, how long will it take her to get completely around the track?

Answer: _____

MathStars

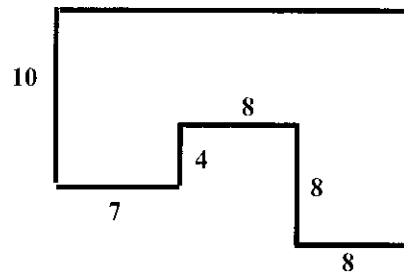★ ★   1. Square ABCD has one side of length 4 cm. Triangle BEC is an equilateral triangle. What is the perimeter of the figure ABECD?

Answer: _____

★   2. George, Susan, Henry, and Sarah are 7, 8, 9, and 10 years old. Henry is older than Sarah and younger than George. Susan is younger than Henry and older than Sarah. What is each person's age?

George's age _____

Susan's age _____

Henry's age _____

Sarah's age _____

★ ★ ★ 3.

1000 x 100 x 10 x 1 x 0.1 x 0.01 x 0.001 =

Answer: _____

★ ★ ★ ★4. Determine the area of this polygon if the segments have the indicated lengths.

Strategy of the Month

Some problems are difficult to "see" even if you draw a picture. For these problems, it can be helpful to actually act out the problem. When you role-play with friends or people at home, you may discover the solution as you act out the problem. Or you may recognize another strategy that will help you find the answer. Sometimes "acting out" a problem can be done with manipulative materials. To find the solution to the problem below, become the director and choose your cast to act this out:

The students were in line at the movie theater to buy tickets. There was a student in front of two students, a student between two students, and a student behind three students. What is the least number of students that could have been in line?
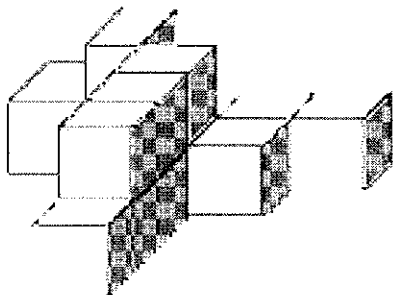
★★ 5. Farmer Brown had a garden plot that was two yards by three yards. He tripled its length and width the next year. What was the area of the new garden? Did the area triple?
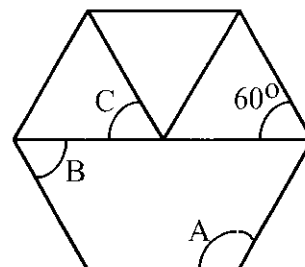
★★★ 6. How many seconds are in one week?

Answer: _____

★★★ 7. What is the volume of the figure below? If it were painted on the outside with purple, how many blocks would have exactly four faces painted purple?

★★★ 8. In a regular hexagon, what is the measurement of angle A, B, and C.

A _____ degrees

B _____ degrees

C _____ degrees

★★ 9. In these addends, each letter represents a distinct digit. Find the digits.

```
  C E N T        T = ____
  C E N T        E = ____
+ S C E N T       N = ____
---------        C = ____
  3 5 1 2 8      S = ____
```

MathStars

★ ★ ★ ★ 1. In Mr. Higdon's class three out of five students prefer chocolate ice cream. Two out of five students are evenly divided in their preference for vanilla and strawberry. If one carton of ice cream will feed ten students, how many cartons of vanilla, strawberry, and chocolate ice cream will Mr. Higdon need in order to give his 25 students their choice of flavors for the class party? How much ice cream of each flavor will be left over?

| | # ice cream cartons | |
	needed	left over
chocolate		
vanilla		
strawberry		

★ ★   2. If you could fold a paper in half six times, how many sections would there be?
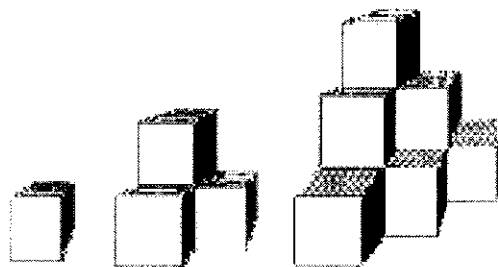
Answer: _____ sections.

How about folding it 8 times?

Answer: _____ sections.

★   3. If 24 out of 60 cows in the field are females, what proportion of the cows are female?

Answer: _____

★ ★ ★ 4. Look at the pattern of blocks below. If each cube has a volume of 5 cm³, what is the volume of the block structure that would come next?

Answer: _____ cm³

Strategy of the Month

What do you do if you have a problem that seems to be very complicated? It may have a lot of large numbers, too much information, or multiple conditions. One approach is to create a simpler problem like the one you need to solve. As you solve the easier problem, you may see the way to solve the more difficult one. Or you may discover a different process that will work with the harder problem. The trick is to be sure that your simpler problem is enough like the original one that the patterns or process you use will help you with the harder situation. **Make a simpler problem** *first as you solve this:*

The houses on Cox Avenue are numbered consecutively from 101 to 950. How many house numbers contain at least one digit 5?

★ ★ ★ 5. A bag contains only red, blue, and orange marbles. There is a total of 36 marbles in the bag. The probability of drawing a red marble is 2/3 and the probability of drawing a blue marble is 1/6. How many of each color are in the bag?

_____ orange _____ blue _____ red

★ ★ 6. Mary Martin owned one-half of a lemonade stand. She sold one-fourth of her share for $150. What was the value of the business?

Answer: _____
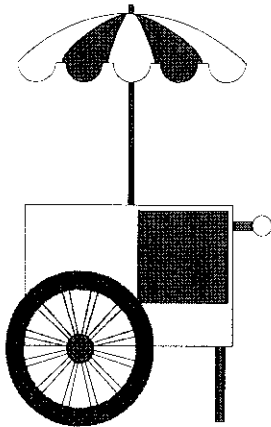
★ ★ ★ 7. The following average daily temperatures were recorded on 12 consecutive days:

56 , 58 , 57 , 72 , 71 , 75 , 55 , 55 , 56 , 55 , 58 , 55

Construct a stem and leaf graph and then determine the mean and median temperature.

Mean _____ Median _____

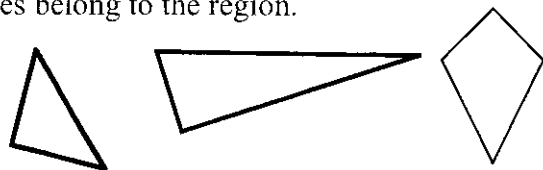What statement can you make about the trend of the temperature during these days?

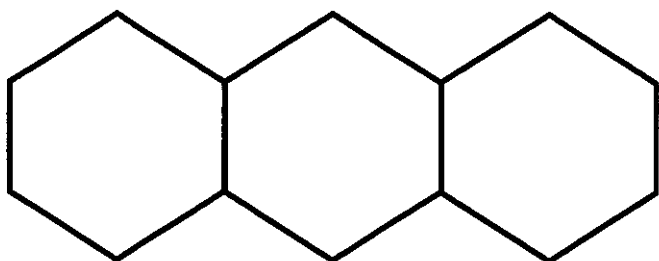★ ★ 8. How many centimeter cubes can be placed in the cube below.
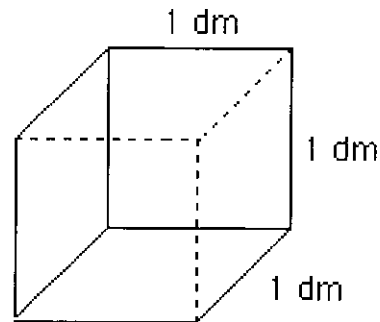
1 dm
1 dm
1 dm

★ ★ ★ 1. Decide where these polygons would go on the Venn diagram below and draw them in. Label the regions of the diagram to indicate which shapes belong to the region.

★ ★ ★ ★ 3. How many triangles in the figure below?
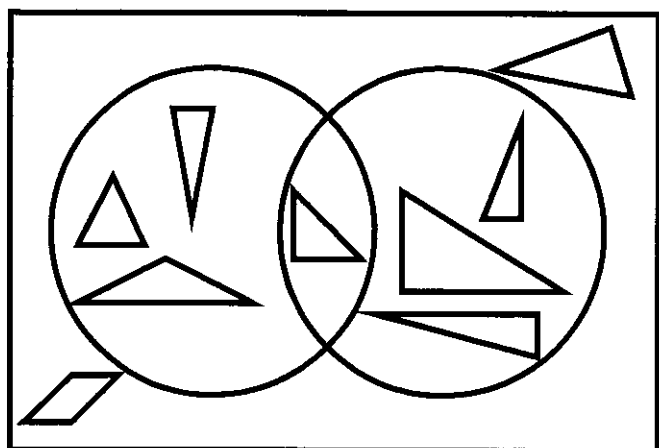
Answer: _____

★ ★ 2. It takes six toothpicks to build one hexagon, 11 to build two hexagons, 16 to build three hexagons. How many toothpicks will it take to build ten hexagons?
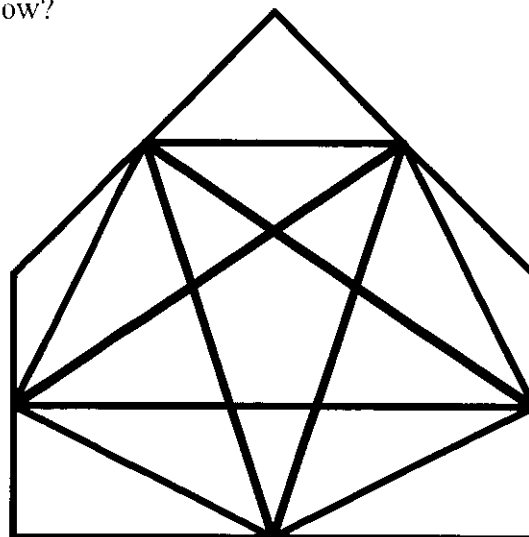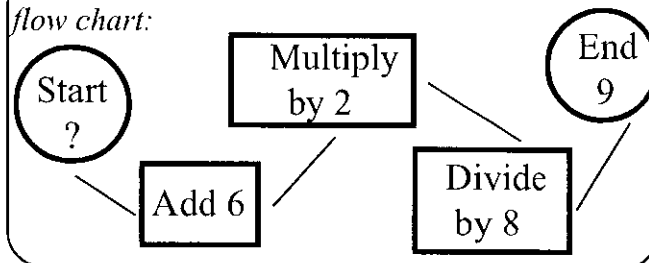
Strategy of the Month

*What if you know the result of a situation, but you don't know the beginning? For example, you might know that you end up with thirteen baseball cards after doing a certain number of trades and you want to figure out how many cards you had before the trading started. In that case you need to work backwards; you have to think about your actions in reverse order. This strategy works for any sequence of actions when you know the end result rather than the starting place. Try **working backwards** to find the starting number on this flow chart:*

Start
?

Multiply
by 2

End
9

Add 6

Divide
by 8

★ ★ ★ 7. The average weight of these bags of potatoes is 30 lbs. What is the weight of the unmarked bag?
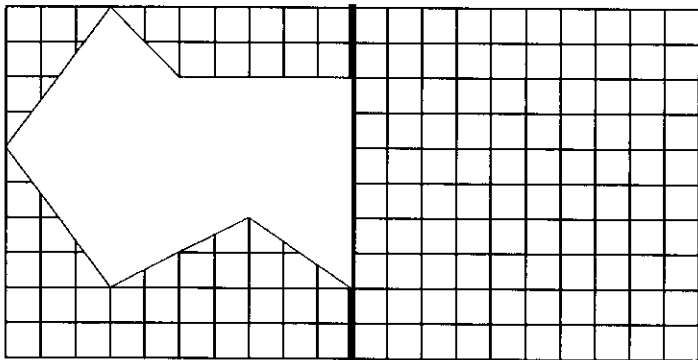
35 lbs   22 lbs

Answer: _____

★   4. Find the sum of the counting numbers from $1 - 25$. In other words, if $s = 1 + 2 + 3 \ldots + 24 + 25$; then find the value of s.
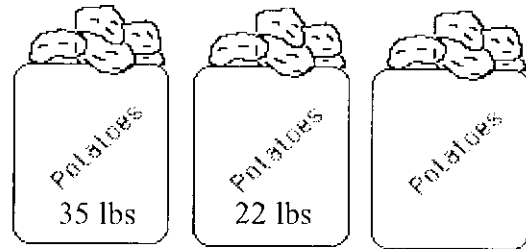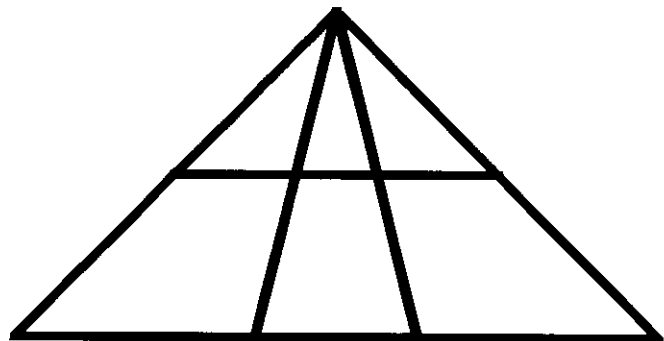
Answer: _____

★ ★ ★ 8. Find all of the triangles.

★ ★ ★ 5. Find the missing operations that make this number sentence true.

$2.9 \boxed{} 1.42 + 6.03 \boxed{} 8.6 = 1.548$

★ ★   6. Draw the reflection of this design.

MathStars

★ ★ ★ ★ 1. Cut the pizza using three straight cuts so that each pepperoni is on a slice by itself. (Slices do not have to be congruent.)
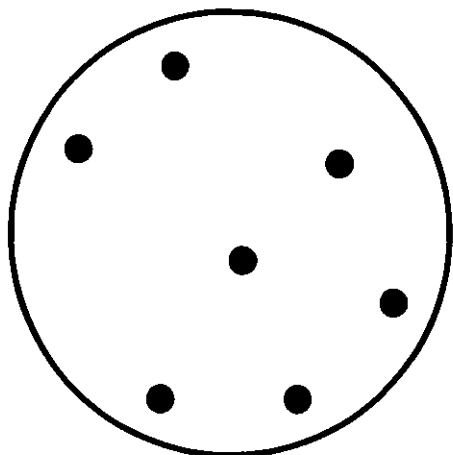
★   2. All the fifth grade classes are going on a field trip. They will take three buses that hold 54 passengers each. If the buses are full and there are seven chaperones going, how many students are going?

Answer: _____

★   3. What is the value of ⌘ if

**(⌘ x 8) + 2 = 26**

Answer: _____

★ ★ ★ 4. The perimeter of a rectangle is 120 meters. The length is twice the width. Find the area of the rectangle.

Answer: _____

Strategy of the Month

*You have tried many ways to solve problems this year. Already you know that when one strategy does not lead you to a solution, you back up and try something else. Sometimes you can find a smaller problem inside the larger one that must be solved first. Sometimes you need to think about the information that is missing rather than what is there. Sometimes you need to read the problem again and look for a different point of view. Sometimes you need to tell your brain to try to think about the problem in an entirely different way - perhaps a way you have never used before. Looking for different ways to solve problems is like brain-storming. Try to solve this problem. You may need to **change your point of view** by asking, "Do all of the lines have to stay within the square formed by the dots?"*

Draw 4 line segments through all 9 dots without lifting your pencil or pen.
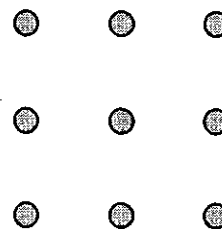
★ ★ ★ 5. In a book with 382 pages, how many 3's would be used to number the pages?

Answer: _____

★ ★ 6. How many numbers can be made from the following digits if each digit is used one time?
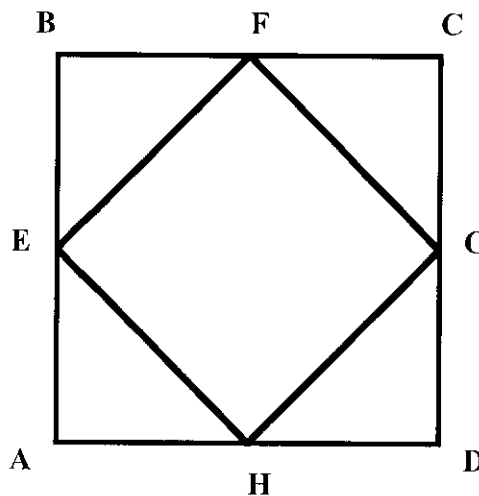
$$3 \quad 5 \quad 9 \quad 6$$

Answer: _____

★ ★ ★ 7. The large rectangle is divided into five congruent rectangles. If $a + b = 10$, find the area of the rectangular region labeled x.
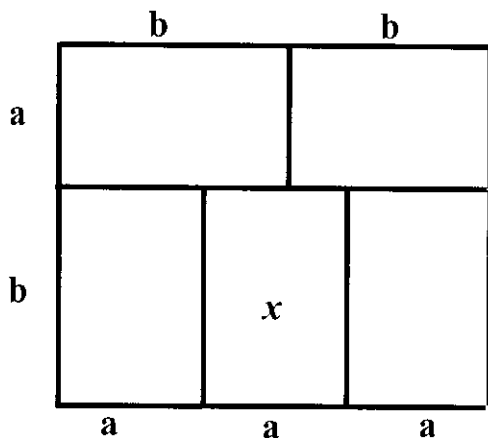
★ ★ ★ 8. Figure ABCD is a square with sides that measure four. E, F, G, and H are the midpoints of the sides. What is the area of ⬜EFGH?

Answer: _____

★ ★ 9. If each letter represents a different digit, what is the value of each letter?

$$\begin{array}{r} A\,B\,C \\ \times \quad\quad C \\ \hline D\,B\,C \end{array}$$