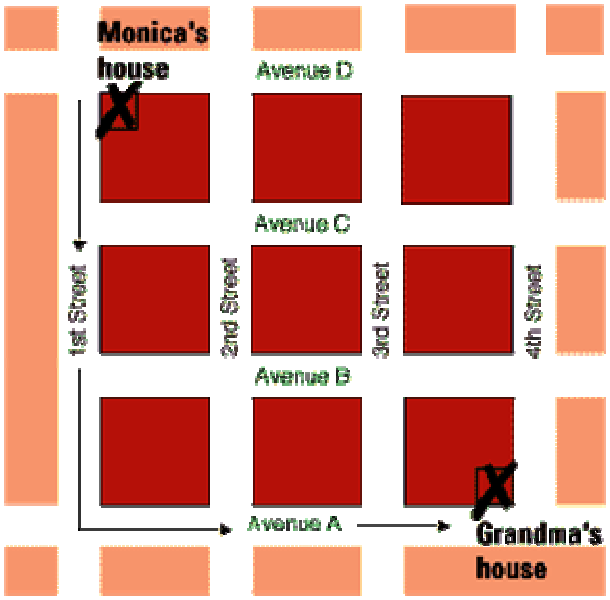
SOUTH DAKOTA SOUTH DAKOTA SOUTH DAKOTA
Counts Counts Counts

All Roads Lead to Grandma's House

Monica goes to her grandmother's house every Tuesday after school. She walks 3 blocks on First Street. Then she turns and walks 3 blocks on Avenue A.

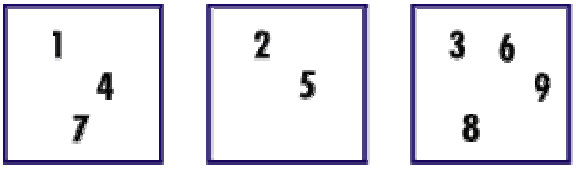
Monica decided to take a different route each week.

How many different routes can Monica take and still walk only 6 blocks?



Digit Sort

The digits 1–9 are sorted this way.



In which box does the digit 0 belong?

How many wheels are on each person's cart?

Cool Carts

Brad, Chloe, Davey, Haley, Lee, and Sheena are making cool go-carts for a contest. Unlike most carts, these carts don't all have 4 wheels. Some have as few as 3, while others have as many as 6. The kids have used 25 wheels in all.

- Chloe has a triangular-shaped cart with a wheel at each corner.
- Brad and Haley evenly shared the 8 wheels that came in one box.
- Lee used 1 more wheel than Haley did.
- Sheena's cart is shaped like a rectangle. It has 2 long sides and 2 short sides. She put 3 wheels on each of the long sides of her cart.

How many wheels are on each person's cart?

Silly Snacks

The 8 girls on Marie's sports team had silly snacks and drinks for the season kickoff party.

- 6 girls ate 2 peanut butter cracker combos each.
- Everyone ate 2 marshmallow munchies.
- Half of the girls ate 1 cherry chew each.
- Erin and Lee did not eat chocolate cookies but everyone else ate one.
- There were 10 snacks left over.

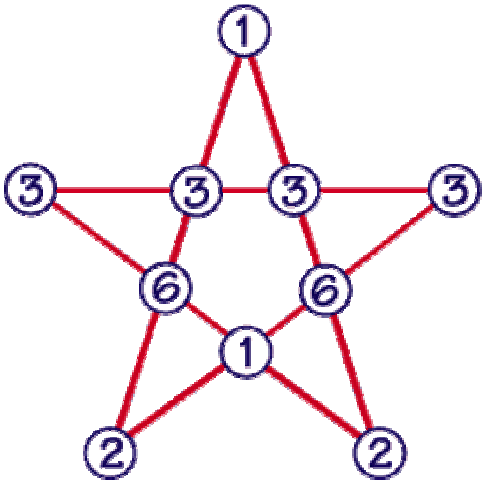
Besides the drinks, how many silly snacks did they have to start the party?

Searching Four Stars

First draw a star on a piece of paper. Put a circle at every place where two lines meet. Think of four numbers between 0 and 9.

Now fill in the circles with those numbers only. Make the four numbers along every straight line add up to the same number.

The numbers 1, 2, 3, and 6 were used to make this star below:



Now it's your turn. Can you pick four numbers on your own and arrange them so that each line of numbers adds up to the same number?

Crazy 8

Choose a digit from 1-9.

Can you make numbers that add to 1,000 using only 1 digit?

You can only use your digit 8 times!

Example:

Try the digit 2:

222 + 222 + 22 = 466

NOT 1,000 — try another digit!

Video Venture

Leroy and his family rented several items from the video store. They kept them all for two days, having rented at least one item in each category. When they paid their rental fees, they received 20 cents change from a twenty-dollar bill.

RENTAL CHARGES

New Releases	Other Movies	Games
$3.40 per day	$3.00 first day $1.50 each additional day	$2.00 per day

How many items did they rent from each category?

Party Plans and Plates

Tianna is planning her party. She bought a package of 2 dozen paper plates. This will give her 2 extras, and enough for each person to have 2 plates: one plate for hot dogs and chips, and the other for ice cream and cake.

Besides her brother and sister, how many friends will she have at her party?

http://www.sprucelog.com/lmp/archives/

We seek order and pattern in all things
and often adjust our paradigm.

What is the next number?

4, 4, 8, 12, 20, 32, 52, 84, 136, 220, ___

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and often adjust our paradigm.

What are the next two numbers in this closed sequence?

38, 46, 64, 83, 226, 234, 243, 262, ___, ___

We seek order and pattern in all things
and often adjust our paradigm.

What is the next number in this series?

1, 2, 5, 10, 17, 26, 37, 50, ____

We seek order and pattern in all things
and often adjust our paradigm.

What is the next number in this set?

H, 3, K, 3, L, 2, M, 4, N, 3, O, 0, P, 1, Q, 1, R, ___

What is the next number in this pattern?

64, 96, 144, 216, 324, 486, 729, ______

What is the next number in the set?

1, 2, 4, 7, 11, ____

Probability Playground
http://www.mathcounts.org/webarticles/anmviewer.asp?a=902&z=107

Each of the four digits in the number 2006 is placed on a different card. Two of the cards are drawn at random without replacement. What is the probability that the product of the two drawn digits is **not** zero?

Lunches for three brothers, Adam, Ben, and Carl are made and the lunchbags are marked with their names. It is dark when they leave for school. They each pick up a lunchbag as they go out the door. What is the probability that **no one** gets their own lunch?

Each whole number from 1 through 50 inclusive is written on a disk, and the 50 disks are placed in a bag. Two disks are drawn from the bag at random without replacement. What is the probablility that the number on each disk is a prime number? Express your answer as a common fraction.

Each whole number from 1 through 50 inclusive is written on a disk and the 50 disks are placed in a bag. Each whole number from 51 through 100 inclusive is written on a disk and those 50 disks are placed in a second bag. One disk is drawn at random from each of the bags. What is the probablility that the number on both disks is a prime number? Express your answer as a common fraction.

Each whole number from 1 through 100 inclusive is written on a disk and the 100 disks are placed in a bag. Two disks are drawn from the bag at random without replacement. What is the probablility that the number on both disks is a prime number? Express your answer as a common fraction.

The solutions to this problem of the week will be available on Monday, October 2, 2006 in the Problem of the Week Archive.

Digital Camera - The Problems

Simon's digital camera has a storage card with a capacity of 32 megabytes. A byte is a unit of storage space. Each picture Simon takes requires 2.6 MB of storage space. How many complete pictures can his storage card hold?

Simon currently has 10 different pictures on his storage card. He chooses 8 of the pictures at random. How many different combinations of 8 different pictures are possible? Answer 45

Simon plans to use the 8 pictures he chose in a two-page display with each page containing 4 pictures organized in 2 rows of 2 pictures on each page. How many different ways can he arrange the 8 pictures?

There are 8 positions to place the pictures. Simon has a choice of 8 pictures to be placed in the first position, 7 pictures in the second, 6 pictures in the third position and so on. There are $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 8! = 40{,}320$ different arrangements of the 8 pictures.

Of the 10 pictures on Simon's storage card, his brother, Marcel, is in 7 of the pictures and his sister, Danika, is in 5 of the pictures. Marcel or Danika appears in each of the pictures. In how many of the 10 pictures do Marcel and Danika both appear?

Marcel appears in 7 pictures and Danika appears in 5 pictures. If they each appear alone in the pictures there would have to be 7 + 5 = 12 pictures. Since there are only 10 pictures, Marcel and Danika must appear together in 2 of the pictures.

From 1937 to 1958, the first class postage rate to mail a letter in the United States was 3 cents. So, for just one dime, people could send three letters! Postage rates have increased since then to the current 2006 rate of 39 cents to mail a first class letter. What is the positive difference between the number of first class letters that could have been sent for one dollar in 1940 and the number of first class letters you can send for one dollar in 2006?

In 1940, 33 first class letters could have been sent for one dollar, 1.00/0.03 = 33 1/3. In 2006 you can only send 2 first class letters for one dollar, 1.00/0.39 = 2 22/39. The positive difference between the number of first class letters a person could have sent for one dollar in 1940 and the number of first class letters you can send for one dollar in 2006 is 33 – 2 = 31 first class letters.

During the years 1937-1958, the 3-cent United States commemorative stamps were usually printed in 5x10 rectangular sheets of 50 stamps. In 2006, the 39-cent commemorative stamps are usually printed in 4x5 rectangular sheets of 20 stamps. What is the ratio of the cost of purchasing a sheet of 50 3-cent commemorative

stamps in 1950 to the cost of purchasing a sheet of 20 39-cent commemorative stamps issued in 2006? Express your answer as a common fraction.
The cost of a sheet of 50 3-cent commemorative stamps is 50 x 0.03 = $1.50. The cost of a sheet of 20 39-cent commemorative stamps is 20 x 0.39 = $7.80. The ratio of the cost of a sheet of 50 3-cent commemorative stamps to the cost of 20 39-cent commemorative stamps is 1.50/7.80= 5/26.

Stamps are also sold in rolls of 100 stamps. Robert has an unlimited number of rolls of 5-cent and 8-cent stamps. What is the greatest value of postage he **cannot** put on an envelope using stamps from these rolls?

The first set of 5 consecutive values Robert can make using 5-cent and 8-cent stamps is: 28, (4 x 5 +8); 29, (5 + 3 x 8); 30, (6 x 5); 31, (3 x 5 + 2 x 8); and 32, (4 x 8). He can make any value greater than 32 by adding some number of 5-cent stamps to one of these five values. The greatest value of postage that Robert **cannot** put on an envelope using 5-cent and 8-cent stamps is 27 cents.

Marta collects first day of issue envelopes. The first day of issue is the day on which a postage stamp is officially put on sale at a particular post office. On the first day of sale, a person at that post office puts one stamp on an envelope addressed to Marta and the stamp is then cancelled with the date of issue and the name of the issuing post office. A few days later Marta finds the envelope in her mailbox. In 2006 the cost of each first day of issue commemorative stamp, including the envelope, is $0.75. If 23 new commemorative stamps are issued in 2006, and Marta buys exactly one first day of issue stamp and envelope for each of these new issues, how much will Marta spend on the first day of issue stamps and envelopes during 2006?

Marta will purchase 23 new issue commemorative stamps with envelopes at a cost of $0.75 each. 23 x 0.75 = $17.25.

http://www.mathcounts.org/webarticles/anmviewer.asp?a=142&z=7