

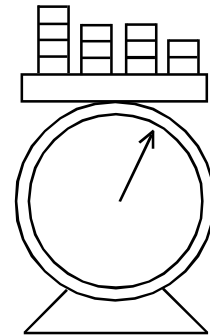
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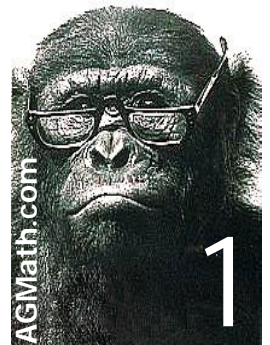
Counterfeit Coins

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A king has 10 stacks of 10 coins. 9 of these stacks are counterfeit, and only 1 of the stacks is real gold. The fake coins weigh 100 grams each, while the real gold coins weigh 101 grams. The king offers this challenge: "Find the stack of gold coins with only one weighing, and I will give it to you."

How can you find the real stack using a scale only once?





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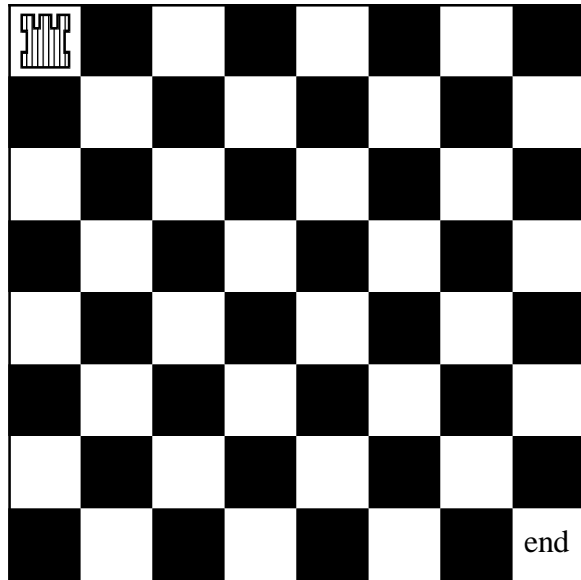
The Rook's Corner

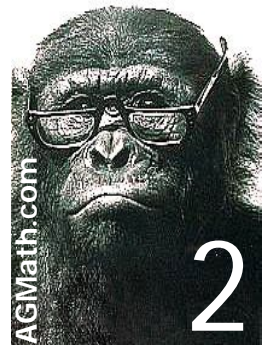
Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Starting at the top left corner of a standard chess board, a rook moves (no diagonal moves) across every square exactly once before ending at the lower right corner of the board.

Is this possible?

Show how it can be done, or find a way to prove that it is impossible.





★★★

Mislabeled Drawers

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

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Scott has three labeled dresser drawers full of socks. One drawer has all black socks. Another drawer has all white socks. A third drawer has both black and white socks. Unfortunately, all of the drawers are mislabeled. Scott chooses a drawer and reaches in without looking and pulls out a white sock. He is able to correctly label all of the drawers.

How is this possible?



★ The Old Man's Walk

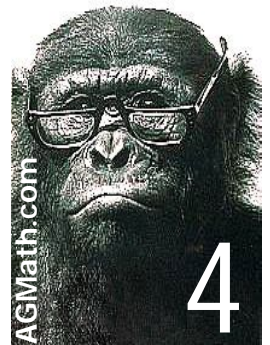
Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

An old man walks from his house one mile due south, turns and walks one mile due east, turns again and walks one mile due north.

Strangely, the old man finds himself at home again.

What is the old man's name?



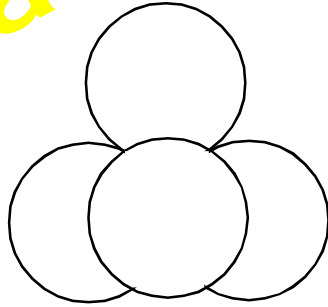


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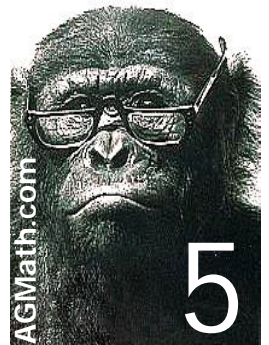
Pencils

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

It is possible to place 4 golf balls so that each ball touches the other three.



Is it possible to place five pencils so that each pencil touches the other four? How about six?

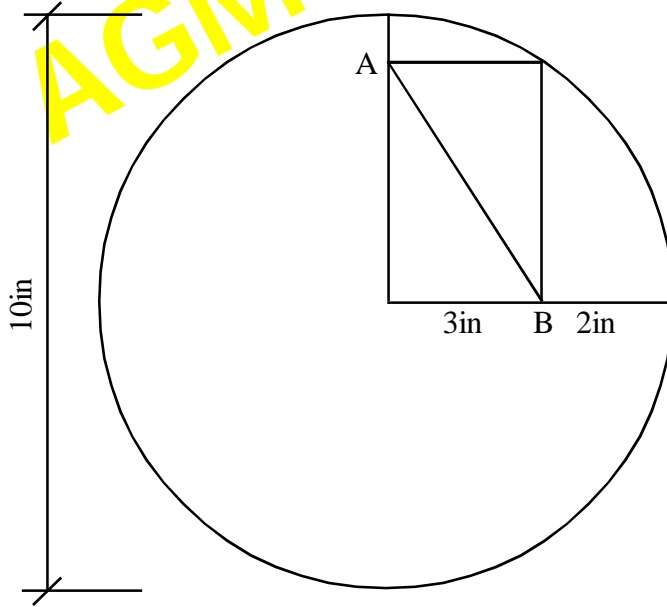


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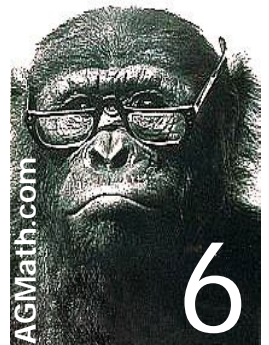
Simple Geometry

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

What is the length of segment \overline{AB} ?



Puzzle of the Week

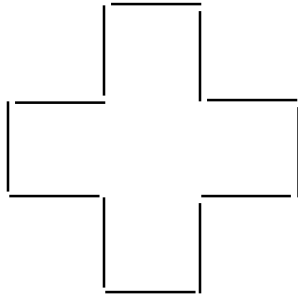
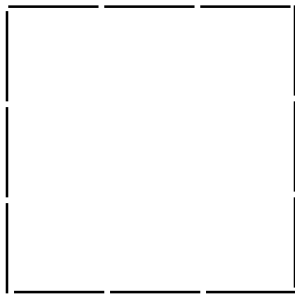


★★★★

Toothpick Geometry

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Twelve one-inch toothpicks are used below to create figures with areas of 9in^2 and 5in^2 . Is it possible to arrange 12 toothpicks (all 12 must be used, no breaking toothpicks) to form a figure with an area of EXACTLY 4in^2 ?





★★★

Dodgeball

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Alvin, Bill, and Carl invent the following dodgeball game:

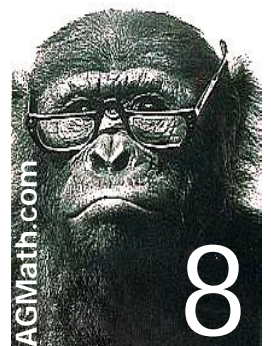
All three players stand in a triangle and take turns making one throw. If a player hits his opponent, that person is eliminated. They play until only one player remains who is the winner.

Al can hit his opponent 50% of the time.

Bill can hit his opponent 75% of the time.

Carl can hit his opponent 100%.

If all three players use perfect strategy, and they go in alphabetical order, what is Al's best strategy? Who will usually win?



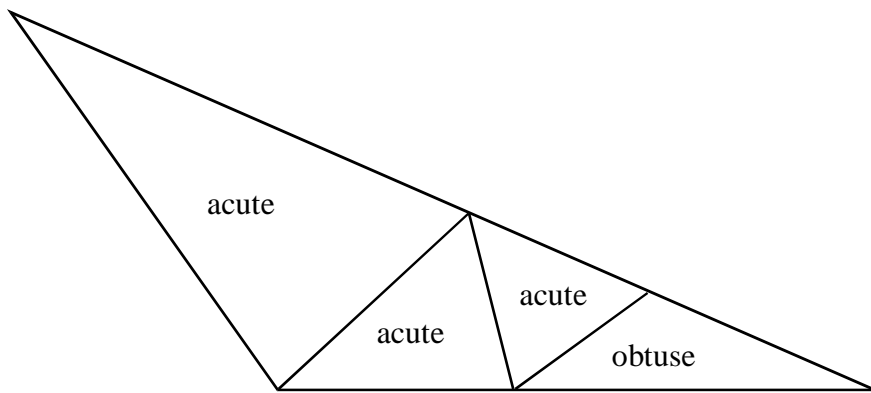
★★★★

A cute triangle dissection.

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Is it possible to divide an obtuse triangle like the one below into several smaller acute triangles? If it can be done, what is the fewest number of acute triangles that can be created by dividing the obtuse triangle?

Below is an example of a failed attempt.



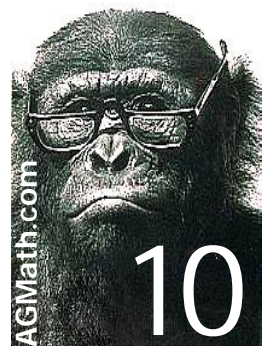


★★

Windy Flight

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A pilot regularly makes round-trip flights from Raleigh to New York City and back. He always flies at the same air speed, and in a straight line. The flight is 500 miles each way. With no wind, the round-trip (flight only) takes two hours each way. With a 50 mph wind blowing directly from New York to Raleigh, will the round-trip flight take more time, less time, or exactly the same amount of time? How long will it take?



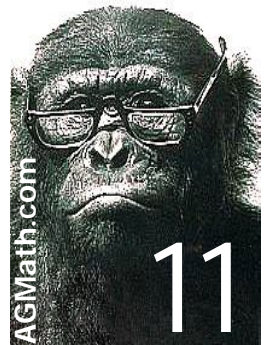
★★

Blue-Eyes

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Whenever you meet two of the Jones sisters (assuming the two you meet are always a random pair), there is a 50% chance that they will both have blue eyes. If three of the Jones sisters have blue eyes, how many Jones sisters are there altogether?





★★★★

Mountain Climber

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A climber leaves at sunrise and ascends the narrow trail that leads to the summit of a tall Appalachian peak. He varies his speed and takes several rests along the way, finally reaching the peak.

The next morning at sunrise he begins to walk down the mountain along the same trail. Part of the way down, he reaches a spot at the exact same time that he was there the previous day on his way up.

When he tells his wife, she says "Of course, that was bound to happen."

She offers a simple proof. What was it?



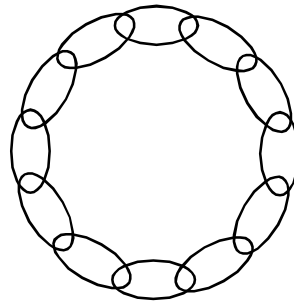
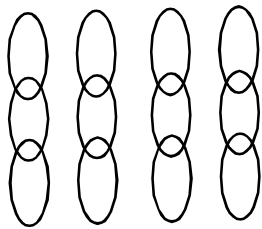
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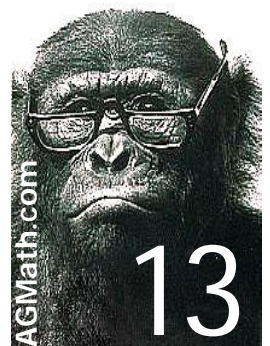
★★

Chain Links

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A woman wants to create a necklace from several short pieces of silver chain. Since it takes some effort to cut the chain links and reconnect them, she wants to make as few cuts as possible. What is the minimum number of links she will need to cut to connect the necklace as shown?

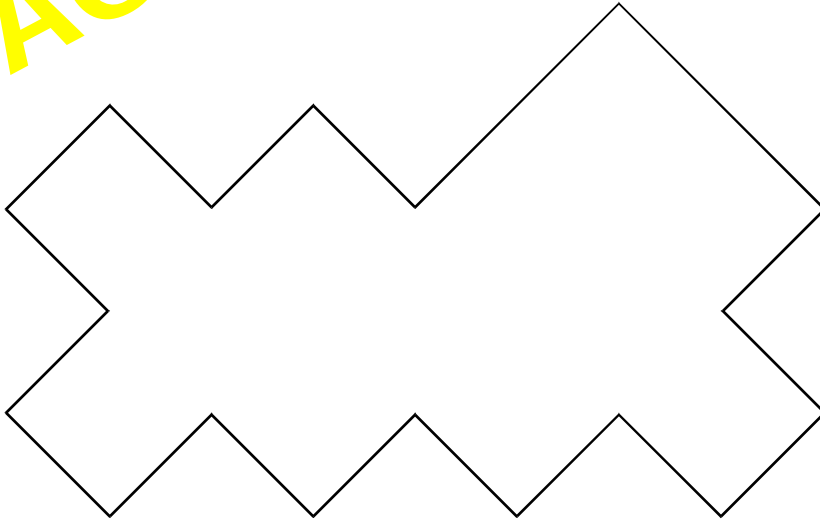




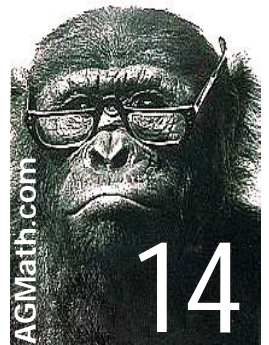
★ Fishy Cut

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

How can you cut the figure below into two identical pieces?



Puzzle of the Week

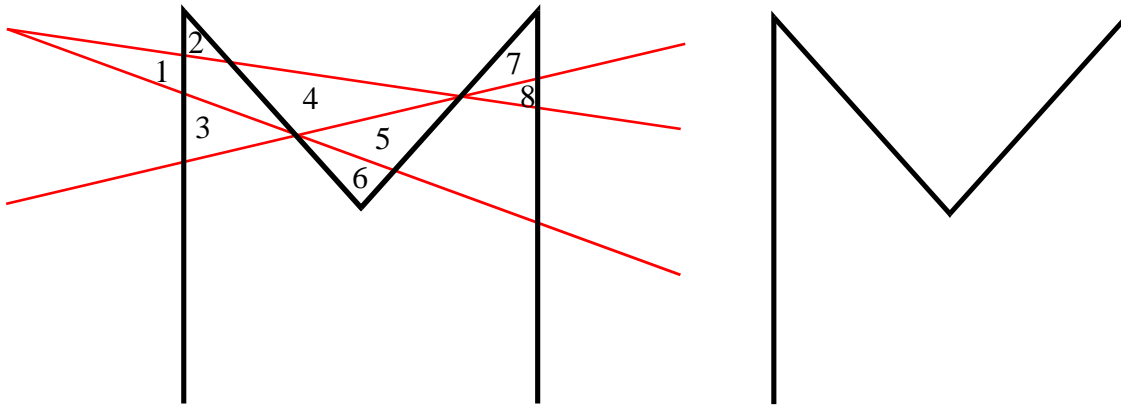


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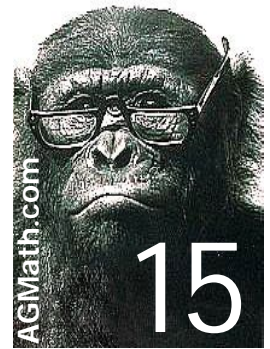
How Many Triangles?

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Below is a diagram of how eight triangles can be formed with three straight lines over the letter M. What is the maximum number of triangles that can be created using only three straight lines?



Puzzle of the Week



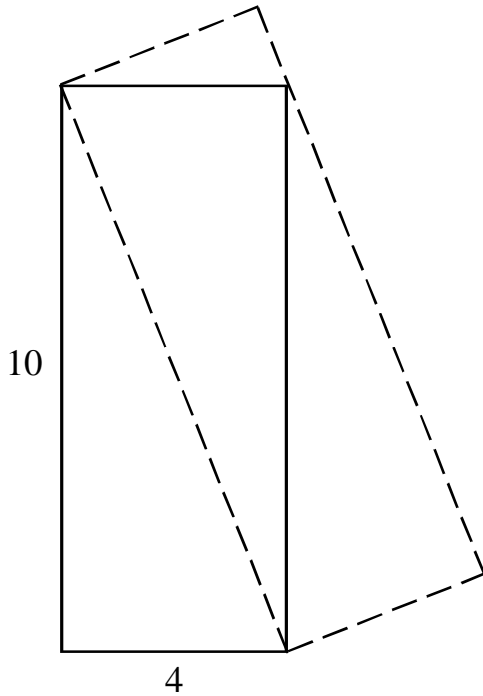
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Easy Area

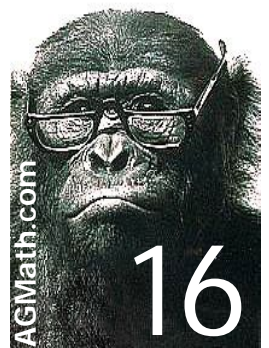
Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Find the area of the dashed rectangle below.

Explain your reasoning.



Puzzle of the Week



★★★

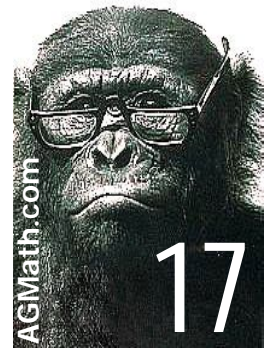
A Counterfeit Coin #1

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You are given four quarters, and told that one of the quarters is counterfeit. It does not weigh the same as a real coin, but you are unsure whether it is heavier or lighter. Using a balance scale only twice, can you determine which is the counterfeit coin, and whether it is heavier or lighter than a real coin?

(Hint: You also have a pocket full of real quarters that you may or may not need to use.)





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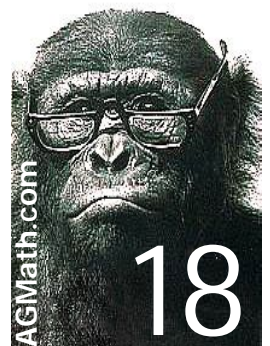
A Counterfeit Coin #2

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

This is one of my favorite and most difficult puzzles:

Given a dozen gold coins, you are told that one coin is counterfeit. The counterfeit coin does not weight the same as the other coins. You do not know if it is heavier or lighter. Using a balance just three times, it is possible to find the counterfeit coin and determine whether it is heavier or lighter than the real coins. How can this be done?

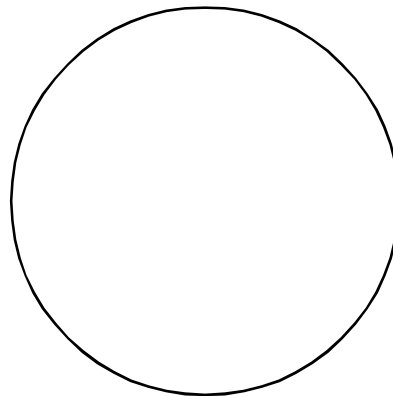
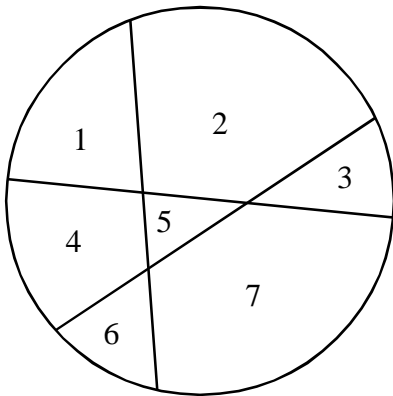


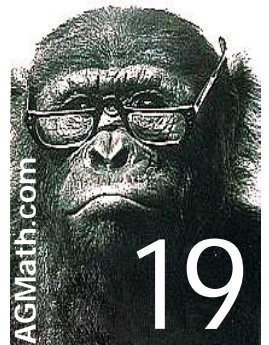


★★★
 πr^2 **No! Pie Are Round**

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Carl has a very strange method of slicing pie. He tries to make as many pieces as possible with as few cuts as possible. With three cuts, he has found a way to make seven slices. How many slices can he make with six straight cuts?

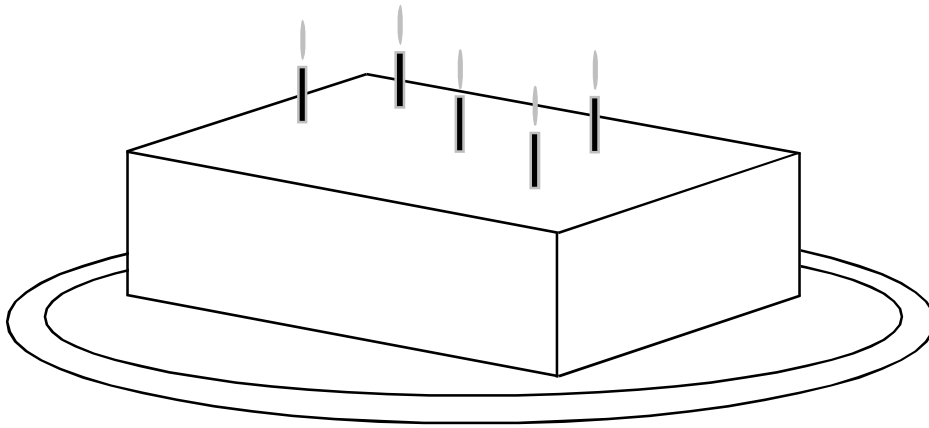


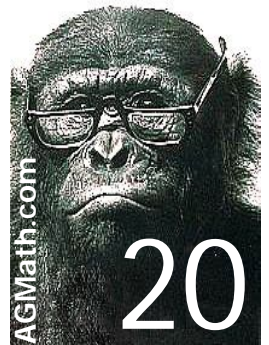


★ Cut the Cake

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Carl made a new discovery when cutting cake. With just three slices, he was able to create eight pieces of cake. How is this possible?



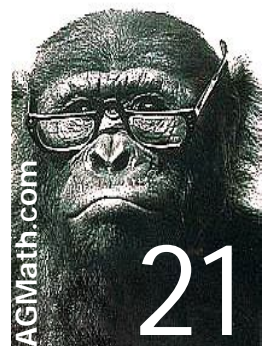


★★★

Paying the Rent

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Roger cannot pay his rent for May in cash. To pay his rent, he offers his landlady one inch of a 31-inch gold bar he owns every day of the month. Since cutting the bar is a lot of work, he decides to give her a one-inch piece for each of the first four days, then on the fifth day he gives her a 5" piece and takes back the four 1" pieces. He cuts a 10" piece and a 12" piece, and is able to pay every day's rent. Is there a better way he can do this by cutting even fewer pieces? How?



★ Uggamugga!

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

On a small island, you are studying two tribes: one of truth-tellers and one of liars. You come across two natives and ask the skinny one if he is a truth-teller.

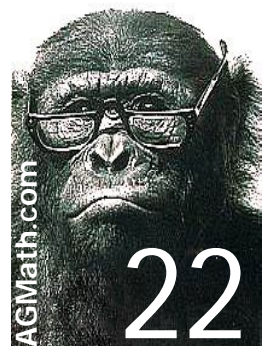
“Uggamugga!” he replies.

You don’t understand, so you ask the fat native what the other native said.

“He say ‘yes’, but him liar!”



Which tribe does each native belong to?

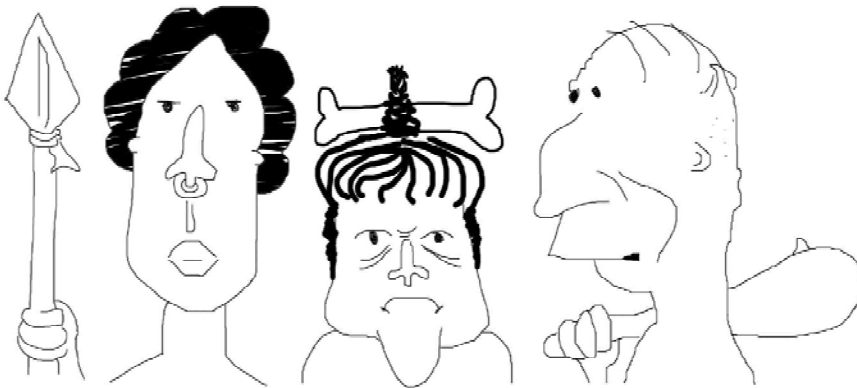


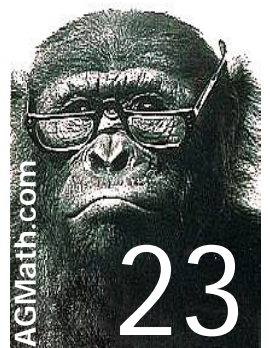
★★ Tribes

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

On a small island, you are studying two tribes: one of truth-tellers and one of liars. You come across three natives: Ak, Bak, and Tak. Ak points to Bak and Tak and says to you, "Them two in same tribe."

You ask Tak if Ak and Bak are in the same tribe. What does he say?



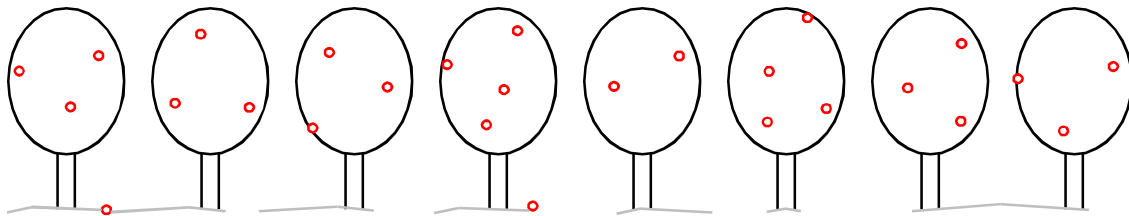


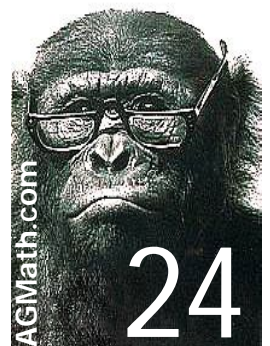
★★★

Orchard

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A man is planting an orchard and wants to keep his rows even, so he buys enough trees to plant eight equal rows. Unfortunately, one dies. He still has enough trees to plant nine equal rows. Before he is able to plant his trees, one is stolen. Incredibly, the man still has enough trees to plant ten equal rows. What is the fewest number of trees the man could have purchased initially?





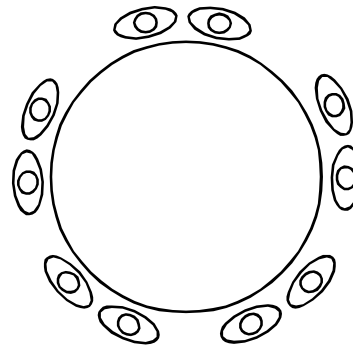
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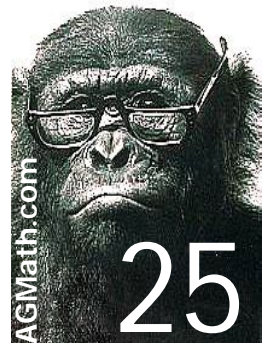
Handshakes

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Five married couples sit down to play poker (10 people). Before they play, each person shakes the hand of everyone at the table that they have not met. After they shake hands, John asks everyone else how many hands they shook. The nine other players respond: 8, 7, 6, 5, 4, 3, 2, 1, and 0.

How many hands did John shake? How many hands did John's wife shake?

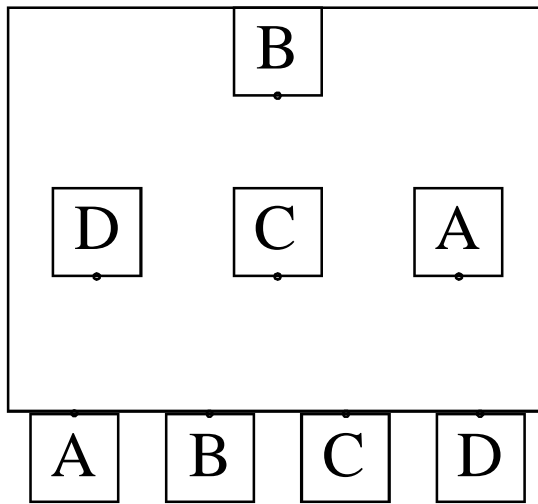


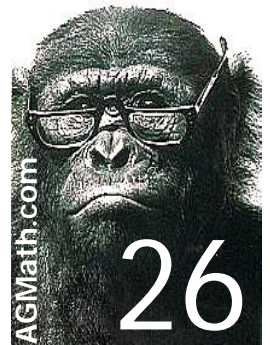


★ Short Circuit

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You need to connect wires between each of the boxes below from the nodes indicated. Is it possible to connect A to A, B to B, C to C and D to D without crossing wires (or leaving the box)? If not, prove it.





★★

In the Kitchen

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A father and daughter are in the kitchen making dinner when the little girl starts the following conversation:

"Is 60 more than 30?"

"Yes honey, 60 is more than 30."

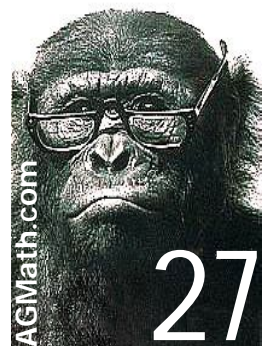
"Is 100 more than 60?"

"No honey, 100 and 60 are the same."

"Is 100 more than 90?"

"No, 90 is more than 100."

If the father was always correct, what were they doing?



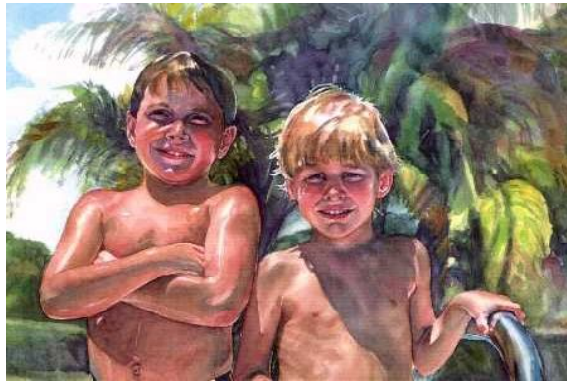
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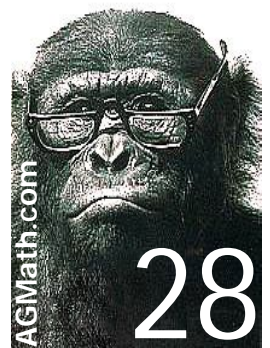
Oh, Brother!

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You are buying gifts for your family. You know that your uncle Bobby has two children, and you remember meeting one of them, who is a boy. Unfortunately, you cannot remember whether the other child is a boy or a girl. What is the probability that Bobby's other child is also a boy?

Hint: It is a puzzle.





★★

Lost Hat

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Upstream or downstream, Ben always paddles his canoe twice as fast as the current he is paddling in (if the current is flowing 2mph, he paddles 4mph relative to the water). One day, he is paddling upstream in a river when a gust of wind blows his hat off of the back of the boat. Not noticing, he paddles for another 40 minutes upstream before turning his boat around. How long will it take for him to catch-up to his hat in the flowing river if he paddles downstream?



★★★

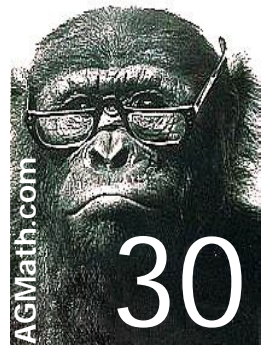
Chicken Nuggets

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Chicken nuggets are sold in packs of 6, 9, and 20. What is the largest whole number of nuggets that you cannot buy?

(Bad Example: You can buy 79 nuggets by purchasing two packs of 20, three packs of 9, and two packs of 6.)



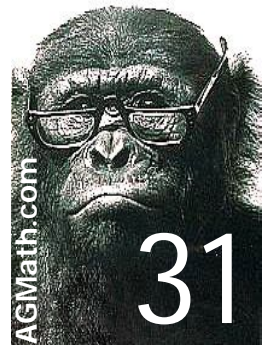


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Fuses

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You have two fuses (long strings like the ones used to light dynamite). Each of the fuses is a different length, but is guaranteed to burn for exactly one hour when you light the end. Unfortunately, the fuses do not burn at a constant rate. One fuse may burn 5 inches in 5 minutes, then a whole foot the next minute. You need to measure 45 minutes with only a lighter and the two fuses. How can you do this?



★★★

Another Orchard Problem

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A man is planting apple trees in his orchard. When he comes in for the evening, his daughter asks him how many rows he planted.

"I planted five rows."

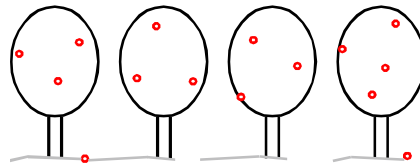
"And how many trees in each row?"

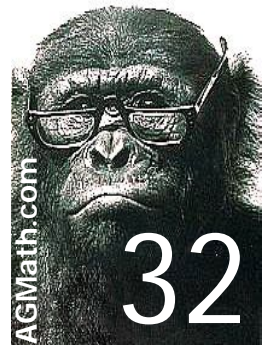
"Four trees in each row."

"So you planted 20 trees!" exclaims the daughter, anxious to show off her math ability.

"No, I only planted ten trees."

How is this possible?



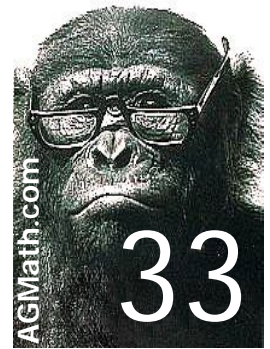


★★★

Dangerous Overdose

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

In order to survive a terminal illness, a man takes medication. He has two medications. If he does not take one (and only one) of each pill, he will die. Unfortunately, the pills look exactly the same and there is no way to distinguish one from the other. One morning, he spills one pill from bottle A and two pills from bottle B and gets them completely mixed up. How can he make sure he gets the right dosage (one of each pill) without throwing the mixed-up pills away and starting all over?

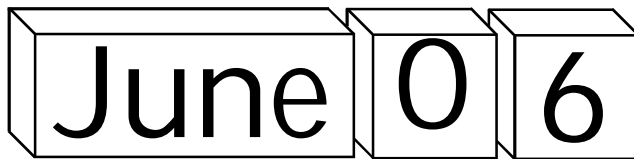


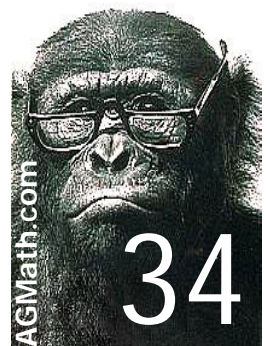
★★

Calendar Cubes

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

For your teacher, you create a calendar. First, you make three blocks which show all twelve months. You need to show the day of the month on two cubes. You need to use the six faces of each cube to represent each day of the month, from 01 to 31. How should each cube be labeled so that every date can be shown?





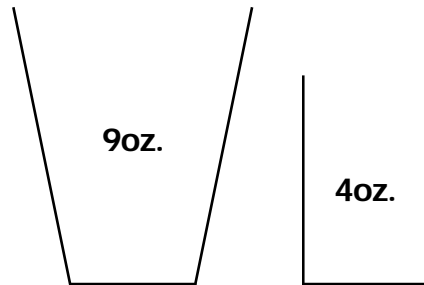
★★

Water Measurement

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You have a nine-ounce glass, a four-ounce glass, and a faucet with an endless supply of water. You can fill or dump either glass. How can you measure exactly six ounces of water? What is the smallest amount of water you can dump in the process?

(note: You are not allowed to make marks on either glass.)





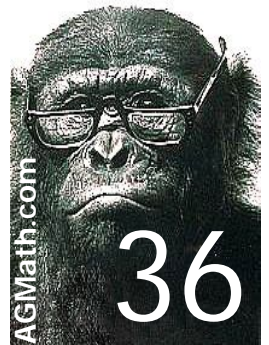
★★★

House Number 12

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You want to put some fancy letters on your house to spell-out your address. The letters don't have price tags. Fortunately the three people in front of you are also buying letters. The first buys O N E for \$2. The second buys T W O for \$3. The third buys E L E V E N for \$5. How much will it cost to buy the letters to spell out T W E L V E ? Correct explanation necessary, no guess-and-check.

T W E L V E

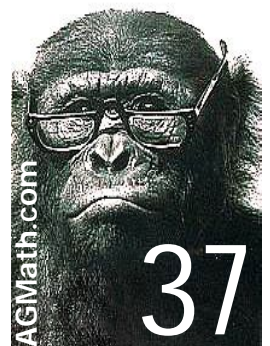
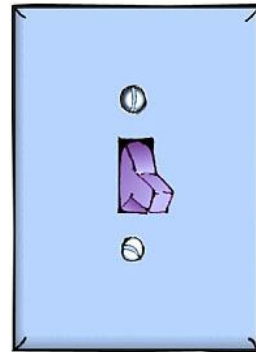


★★★

On Again, Off Again

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

In the school office after hours, you find a strip of 25 light switches corresponding to rooms 1 through 25. All the switches are in the on position when you start flipping them. You start by flipping every 2nd switch (2,4,6...) then every third switch (3,6,9...) followed by every fourth switch (4,8,12...) then every fifth, etc. until you flip only the 25th switch. You check the lights in every classroom. Which rooms have the lights on?



★★★★

Bridge Crossing

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Five men are crossing a rickety old bridge in the dark, strong enough to hold only two men. They have only one flashlight. Each man travels at a different speed. Al takes one minute to cross, Bill takes two, Carl takes 5, Dan takes 7, and Earl takes 10. Traveling together, two men can only go as fast as the slower man. What is the shortest amount of time all five men can take to reach the other side of the bridge?

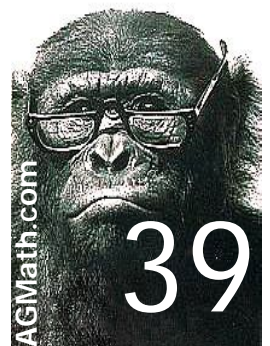




★★ Men With Hats

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Four men are arrested and brought to the local jail. There is not enough room for them, so the sheriff makes a deal. Three of the men are lined up facing forward so that each can only look ahead. The fourth is placed in a cell out of view. Each is given one of four hats, two white and two striped. If any of the men can guess the color of his hat (without communicating), all four will be set free, but a wrong guess gets all four men killed. What is the probability that at least one man will know the color of his hat?



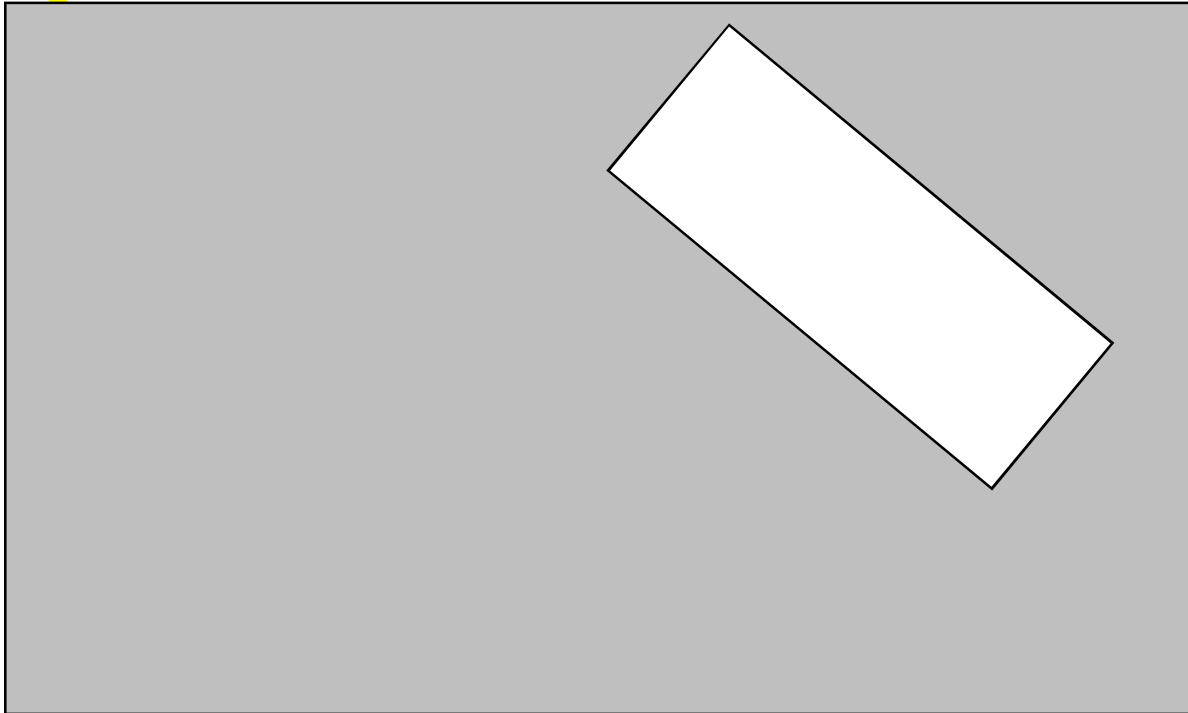
★★★

Hard-to-Halve

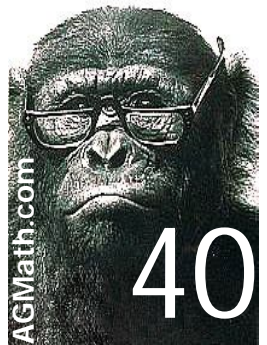
Solve:

FOR THIS PUZZLE, SHOW ALL CONSTRUCTION MARKS.

Draw ONE STRAIGHT LINE which divides BOTH of the rectangles below into halves of equal area, creating two grey areas of equal area:



Puzzle of the Week

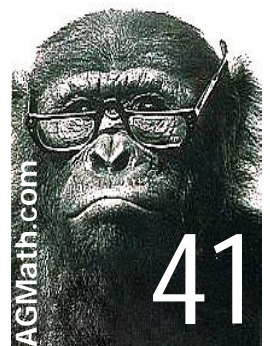


★★★★

I Like Coconuts

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

Stranded on an island, Al, Bob, and Carl find a big pile of coconuts. They decide to wait until morning to divide them, but in the middle of the night Al wakes up and decides to take his share. He divides the coconuts into three equal piles, hides his, and throws one leftover coconut to a nearby monkey. Bob awakes and does the same, followed by Carl, each dividing the remaining pile, hiding his share and throwing one leftover coconut to a monkey. In the morning, they divide what is left equally and there is once again a leftover coconut (which they throw to a nearby monkey). What is the fewest number of coconuts that they could have started with?

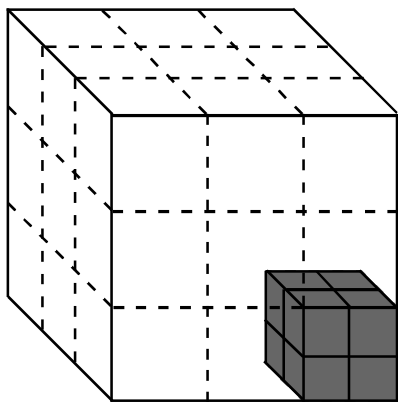


★★★★★
CUBED!

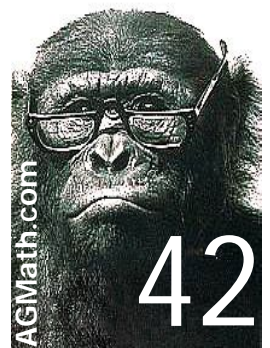
Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

A cube can be subdivided into smaller cubes as shown below. Those smaller cubes can be subdivided as well, creating infinite possibilities for dividing a cube into 'n' smaller but not necessarily identical cubes.

Show how a cube can be subdivided into 49 smaller cubes.



In this example, there are 8 small cubes and 26 'large' cubes = 34.



★★★

I got the digits!

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

The sum of $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45$.

The product of these digits is $9! = 362,880$.

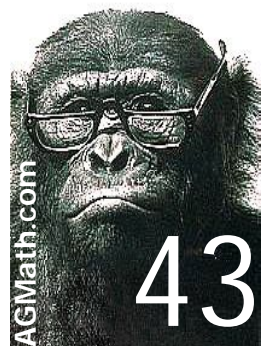
Find nine single digit integers with the same sum and product as the digits 1 through 9.

Bad example:

$$9 \times 8 \times 8 \times 7 \times 5 \times 3 \times 3 \times 2 \times 1 = 362,880$$

but

$$9 + 8 + 8 + 7 + 5 + 3 + 3 + 2 + 1 = 46 \text{ (close, but not correct)}$$



★★★

Escape the Nerds!

Solve this puzzle and submit a written solution and EXPLANATION to get your name listed below:

You have been kidnapped by a band of disgruntled math pranksters from MIT! The kidnappers blindfold you, place you into a dark room and force you to wear thick gloves. They toss 100 quarters into the room on the floor and offer you the following deal: "21 of the coins on the floor show heads, the other 79 coins show tails. If you can sort the coins into two piles, each containing an equal number of coins showing heads, we will release you."

How do you escape the nerdy miscreants?

