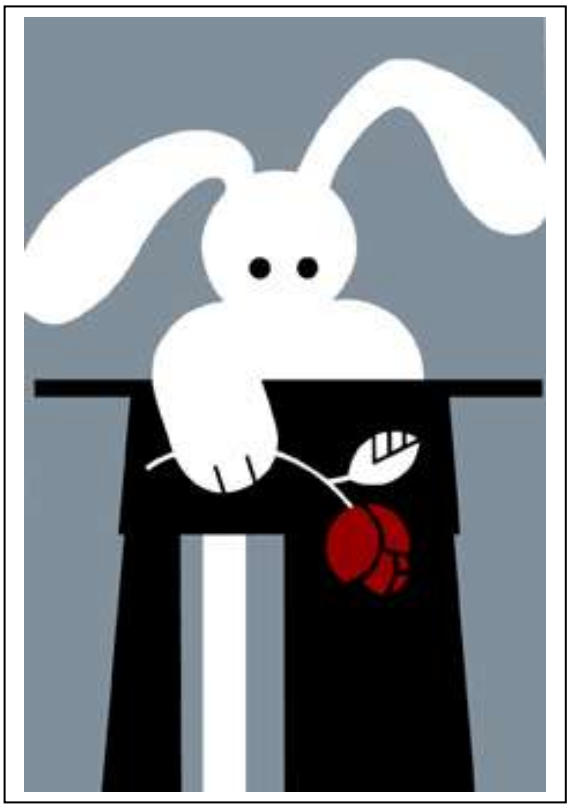
ArithmaTricks



Abra-Kid-Abra
314-961-6912
www.abrakid.com

Thanks for having your child participate in our ArithmaTricks program. These notes are provided to help you assist you child in mastering the tricks. The notes are based on our 15 hour camp. If your program is less hours, not all this material will be covered, so some of it will be extra. If you have questions on anything, please let us know. 314-961-6912 info@abrakid.com Good luck!

$20 Shuffle (also called Bill Clip Card)

Effect: You show a card with a picture of 5 bills—4 $5 bills and a $20 bill in the middle. You turn the card upside down, where the backs of the bills are visible (though there's no markings on the back). You say that you'll mix up the cards, and see if the spectator can keep her eye on the $20. You shake the card (supposedly mixing them), then ask her to put the paper clip on the $20. She clips the middle bill. You turn the card face up, showing that she clipped a $5 instead!

Props: $20 shuffle card, paper clip

Secret: This trick is self-working. The way the cards are spread, when you clip the middle card on the back side, it shows on the front that you are clipping a different card.

Presentation: "I brought with me today a picture of 1 year's worth of allowance. (Show card with bills number side up.) 5-10-15-20-40 dollars. That's almost $1 per week! You have a sharp eye, I'm told. Is that true? I'm going to turn the bills over and your job is to keep your eye on the $20 bill in the middle. Do you think you can do that? I will mix up the cards. (Turn card face down and shake it.) Alright, can you take this paper clip and put it on the $20. (Spectator should clip the middle card.) How did you know where the $20 is? (Turn card face up.) It's over here actually, but you were very close!"

Performing Tip: If it is hard for students to put the paper clip on the card, they can use their fingers instead—thumb and first finger-to "clip" the $20.

Math Learning: 1) Skip counting by 5s to 20. 2) Measurement—different currencies.

Penny & Quarter Trick

Effect: Magician shows 2 coins in her hand, a quarter and a penny. Phase 1) She puts the penny in her pocket, asking what that leaves in the hand. "The quarter", says the spectator. Yet the magician shows a quarter & a penny! Phase 2) She puts the quarter in her pocket. What does that leave in the hand? "The penny", says the spectator. The magician opens her hand to show nothing!

Props: 2 plastic pennies, 1 plastic quarter, & blue tak

Secret: There is an extra penny that is stuck to 1 side of the quarter.

To Make: Using a small piece of blue tak, afix the penny to 1 side of the quarter, slightly off center.

Mechanics: Phase 1: Hold your left hand palm up. Put the quarter (with penny stuck underneath) on left fingers. Set penny atop the quarter. Right hand takes the penny, as left hand closes. As you bring your left fingers to the palm in the act of closing the left hand, the quarter naturally turns over, resting in the left palm. When you open your left hand, it now shows that the penny has returned!

Phase 2: Right hand grabs the edge of the quarter nearest the left fingers. As your left hand closes, right hand turns over the quarter, as though dumping the penny in the left palm, then comes out with the quarter. (The penny on the underside is hidden from the spectator's view.) Pocket the quarter (and penny beneath it). Spectator thinks the penny is still in the left hand. Open left hand to show it has vanished!

Presentation: Start with the coins in your right hand, the secret penny against your hand. "Yesterday this guy had a baseball card I really wanted. All I had was 26 cents. (Toss the coins casually, 1 at a time into your left hand. Younger magicians can just start with the 2 in the left hand.) I didn't want to spend all my money, so I put the penny in my pocket and offered him 25 cents. (As right hand removes the penny from your left, left hand closes into a fist, as right hand puts the penny in your right pants pocket.) He said, 'I need 26 cents.' I said ok. I wiggled my fingers (wiggle right fingers over left fist) and there was 26 cents. (Open to show the penny has returned.)

I said, 'You know, I think that's a little high.' I put the quarter back in my pocket (Right hand takes quarter out of left hand, as left hand closes into a fist, supposedly still holding the penny. Keep the penny on the side of the quarter that is toward you, so the audience just sees you holding the quarter, which you pocket) and said, 'How about 1 cent?' (Shake left fist a little, which, the audience thinks, has the penny.) He said no. I said, "good, because I don't have one cent anyway!' (Open left fist to show it empty.)

Tips:

- Try to avoid a presentation where 2x you ask the spectator what's in the hand, then proving him wrong, putting him down.

Challenge Tips:

- Start with the 2 coins in the right hand, and toss them casually into the left. This subtly shows that you have just 2 coins.
- Similarly, when the right hand takes the quarter out in phase 2, drop it from the right finger tips onto the right fingers or palm. Or, slide it along the right palm. Then put it in your pocket. Again, this handling subtly conveys that you only have 1 coin.

Math Learning: Adding & subtracting around the equation 1+25=26. E.g. 26-1=25. 26-1-25=0.

Invisible Money (Question Box)

Effect: You hand a spectator 2 invisible dimes and an invisible nickel. You ask him to put them in you drawer box. You say Abra-Kid-Abra, open the box up, and show that the coins have changed into an invisible quarter! Ha Ha. Then it changes into a visible quarter, and a penny for a tip!

Props: Question Box (black plastic drawer box) and, from the quarter penny trick, a play quarter (with penny taped to it is fine) and a play penny.

Secret: The box has 2 compartments. A secret panel/switch on the back side of the box (opposite the side where the drawer opens out) determines which of 2 compartments you show. Push it to 1 setting & it shows the first compartment. Push it to the 2nd position and it shows the 2nd compartment.

Mechanics: You can only put the quarter in 1 compartment and be able to close the drawer. Put it in that one before the trick starts. We'll call it compartment #2. Push the switch so when you open the drawer, it shows compartment #1, which is empty.

Practice pushing the switch to both positions, so you can smoothly switch when you want to.

Presentation:
"Do you have a quarter for 2 nickels and a dime? (Reach into your pocket, pulling out invisible coins.) Can you hold these for a moment (put invisible coins in her hand). Do you know what those are? Two invisible dimes and an invisible nickel. Have you ever seen invisible coins before? Would you put them into this box. (Open empty drawer.) Careful not to drop them, they are hard to find. Did you put them in the drawer? Good. I will close the drawer. Can you say Abra-Kid-Abra. Believe it or not, when I open the drawer (do so), they have changed to an invisible quarter! THAT was a pretty good trick, wouldn't you say? It has taken me 10 years of practice. (Close drawer & push switch to compartment #2.) Of course if I was really a magician, I could change it into a real quarter. (Open drawer showing the quarter. Dump it and the loose penny onto your palm. Don't show the penny taped to bottom of the quarter.) I changed it into 26 cents because I like to exceed expectations!" (Now, if you like, you can go into the penny-quarter trick.)

Notes:

- Substitute a real quarter if you like.
- Alternate ending: Just produce the quarter (not the penny). Say that if you were a real magician, you could turn the invisible quarter into a real one (show it). But unfortunately you don't know that trick.

Reading A Die's Mind

Effect: Spectator rolls any number on a single die. Magician mind reads the number on the bottom of the die.

Props: 1 die (from dice tunnel trick).

Secret: The top & bottom of a die always totals 7. So, whatever the number is that is rolled, subtract it from 7 to get the bottom number. E.g. If spectator rolls a 5, 7-5=2, so 2 is on the bottom.

Presentation: Can you take this die and roll any number. You rolled a 5 (or whatever it was). We can all see that. I am going to try to read the dice's mind & tell what is where we cannot see—the bottom. Let me concentrate. It is a…2! Is that right? Alright! It's strenuous for me to do that, you know.

Challenge version: Have the spectator roll 2 dice while you are not looking, & stack them up. Ask the spectator to add the 3 faces that are not visible—the bottom & the 2 sides touching each other. You turn around & correctly announce the total! How? Note the top # and subtract it from 14.

Math Learning: Subtracting different numbers from 7.

Dice Tunnel

Effect: Magician shows a tube that accommodates a die. She demonstrates how she can slide a die in 1 end & it comes out the other with, naturally, the same number facing up as went in. However, when she says Abra-kid-Abra, when the die comes out the other end, it is a different number than when it went in! There is no room in the tube for the die to turn!

Props: Dice Tunnel & die that comes with it

Secret: Though the spectator sees 2 holes on top of the tube near either end, there is also a 3rd secret hole in the middle in the bottom. If your finger is flush against the hole in the bottom, the die slides through normally. However, when your finger isn't against the hole, if you slide it right—and it takes a knack to get this—the dies makes a ¼ turn, coming out with a different number showing.

Handling: Hold the tube with hole resting against your fingers. When you put the die in, your thumbs blocks the ends so it doesn't fall out. First, slide the die through, showing that the die is normal. E.g. a 6 comes out a 6. The 2nd time, don't hold your finger flush against the bottom hole, and have it change to a different number. You can either make the die turn by itself, catching it in the secret hole, which turns it ¼ turn. Or, once it catches in the hole, you may find it helpful to then push your fingers flush against it, nudging it along.

Presentation: "This is an unusual die. Would you like to examine it? (Hold it out, offering it. When the spectator reaches out for it, take it away, comically.) Thank you very much. Let me show you something odd about it. If you put it in with the 6 facing up & slide it through the tunnel (do so), it comes out a 6. However, if you put in a 4. (Do so.) When it comes out the other end, it changes to a 3 (or whatever it is). Odd, isn't it? Put tunnel away before spectators grab for it to look."

Teaching Tips:

- Stress putting the thumbs on either end; otherwise you'll have dice flying everywhere!
- You might suggest that the tube & die go in the ziplock bag to prevent losing it.
- Have the kids make up their own story. E.g. you could roll the die a few times, rolling different numbers. Mention that the tube is a time warp. When you put in a number, it comes out a number that you rolled a while ago—going back in time!

Invisible Dice

Effect: Spectator rolls 2 invisible dice. Then she does some numerical computations. The magician is able to tell her the numbers she rolled!

Props: Pencil and paper, and a #6.75 white envelope with label with instructions.

Secret: Subtract 4 from the spectator's final number. This yields an ending 2-digit number—each is 1 of the dice! E.g. if the ending 2-digit number is 23, the spectator rolled a 2 and a 3.

Presentation:

1. (Bring out envelope and pull out the invisible dice. Set the envelope on the table, using the flap as a tripod, so you can casually glance at it and give the instructions to the spectator.)
2. Do you know what these are? (Hold up hand with invisible dice.) It's a pair of invisible dice. They are extremely rare. Would you take them in your hand, shake them up, and roll them on the table. Do you see the numbers you rolled? Write them down. I will not look. Pick one of the numbers.
3. Multiply it by 5.
4. Double it.
5. Add 4.
6. Add the other dice's number.
7. What number did you arrive at? (Subtract 4.) Were the numbers you rolled ___ and ___? (Reveal the numbers.) (Yes) Do you know how I knew? You left the dice right out in the open on the table!

Challenge Version: In step 4, add 25 instead of 4. (Note this on your envelope.) In step 7, you then subtract 25 instead of 4. Use this with older students.

What is the algebra that makes this work? $((5x)* 2) + 4 + Y = 10x + Y$

Math Learning: This helps build facility in mental addition, subtraction, and multiplication.

Geo Double Dipper

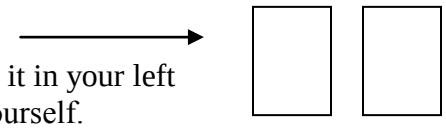
Effect: You show 10 cards numbered 1-10, each with a different geometric shape. You mix them and a spectator cuts the packet. You show them 2 cards (the one they cut to and the next one), put them back, bury them in the middle, and have the spectator cut the cards. You have the spectator deal the cards in to 2 equal face down piles, alternating back & forth. You then look at the card in each pile, setting out 1 face down card on the table from each pile. These are the cards the spectator picked!

Props/Prep: Sheet of 10 perforated geo cards & rubber band to keep them together.
Tear them off so you have a packet of 10 cards.

Secret: When you begin, the cards are in order 1 through 10. When you mix them up, you give them single cuts, which does not disturb the order. (i.e. when you are done cutting, the cards will be something like: 4 5 6 7 8 9 10 1 2 3.) Note that they alternate even-odd. When you show the spectator the 2 cards she cut to, when you put them back, you subtly reverse their order. Now, instead of all the cards alternating even-odd, these 2 in the middle will be the only ones not alternating. I.e. you'll have something like: even odd even odd odd even even odd even odd. When the cards are dealt into 2 equal, alternating piles, 1 pile will have all even & 1 odd card, and the other pile, all odd & 1 even card. So all you do is find the one in each pile that is different. I.e. pull out the odd card from the even pile, and the even card from the odd pile.

Mechanics:

1. Start with the cards in order 1 thru 10 in a face down packet. (Doesn't matter whether 1 is on top or bottom.)
2. Give the cards a few single cuts, supposedly mixing them up.
3. Set packet face down on the table. Ask spectator to cut the cards.
4. Pick up the card she cut to in your right hand, and the one beneath it in your left hand. Show these cards to the audience, but don't look at them yourself.
5. Put them back where you got them. The right hand puts its card beneath the left hand's card. This subtly switches the order of these 2 cards without the audience being aware.
6. Set the top half back on the bottom half, burying the 2 selected cards back in the middle from whence they came.
7. Have the spectator cut the cards and complete the cut (to further mix them a bit).
8. Ask the spectator to "deal the cards back and forth (point with your finger to 2 spots on the table) into 2 equal piles".
9. Pick up the first pile, look at the faces, and pull out the oddball card and set it face down on the table. (i.e. if you have the even pile, pull the odd card. If you have the odd pile, pull out the lone even card) Do the same with the 2nd pile. While doing this, you might say something like "Now you could have cut the cards any place you like. Was there any reason that you chose those 2 particular cards?"
10. Ask the spectator which shapes she selected. Turn your 2 over to reveal her 2 cards!



Challenge Version: The 2 cards the spectator selects will be consecutive (e.g. 4 and 5). If you like, when putting the cards in order at the beginning, mix up the odd cards. E.g. you might have: 3-2-7-4-1-6-9-8-5-10. (Note that they still alternate even-odd.) Then the 2 cards the spectator selects won't likely be consecutive. Also, if you have 2 spectators, you can have them each take their cards instead of you holding them. #1 picks his, # 2 takes hers. Have #1 put his back, then #2 put hers back. This subtly reverses their order.

Math Learning: Distinguishing between even and odd quickly. Familiarity with geometric shapes.

Geo Telepathy

Effect: You show a packet of 10 cards, each with a different geometric shape. Spectator shuffles them, and you put the cards behind your back, then bring them out with the face of the packet facing the audience. (Photo #1 shown with animal cards, which could as well be geo cards.) Even though you don't see the face of the packet, you are repeatedly able to name the geometric shape on the face of the packet!

Props: Packet of 10 geo shape cards and rubber band to keep them together.

Secret: After the cards are shuffled, put the packet behind your back & reverse the top 3 cards. (Photo #2) Bring out the packet, face toward the audience. The first time is (from the audience's view) the dry run. You explain that you'll show them the card on the face of the packet (it's obvious that you cannot see it) and you'll try to tell what it is. As you explain this, you memorize the shape staring at you atop the packet. (Photo #3)

Put the packet back behind your back. (Careful not to flash the reversed top card on top.) Pull the top card around to the face of the packet, turning it face down. This is the 1 move in the trick, which you'll repeat each round. Bring the packet out from behind your back. Mind read the card facing the audience. Then memorize the one facing you. Do this 3x. Each time, you are one ahead!

Teaching: Have the kids do these moves, all together:

1. First, do the moves with the deck in front of them, so they can see & understand the moves.
    a. Turn top 3 cards of their deck face up (all together).
    b. Turn top card face down & put on bottom of deck.
    c. Repeat two times.
2. Now do all of this behind with cards behind your back.
3. When you can do that, then try the trick with the talking.

Presentation: "What do you do for a hobby? My hobby is collecting geometric shapes. I have a square, rectangle, octagon,… (you say as you show them—a few cards). Would you shuffle the cards. (As spec starts) But don't disturb the order. Just joking. Shuffle them well. I'm going to put the packet behind my back, then I'll bring them out and show you the card on the face. Using my vast mental powers, I will attempt to tell what the card is. Do you think I can do that?

I'll put the packet behind my back. This requires a great deal of concentration, of course. Do you see the card on the face? It's…the pyramid!

It was probably just lucky. Let me try it again…"

Tips:

- Pretend like you are concentrating and that it takes lots of effort to get it.

Photo 1. Audience view

Photo 2. Behind your back, turn over 3 cards on top of the deck.

Photo 3. As magician shows card on the face to the spectator, secretly magician glimpses the top card.

Geo Duck and Deal

Effect: You show 10 geo cards numbered 1 through 10, and give them a mix. You hold the stack face down in dealing position and proceed to deal the cards singly into a face down pile on the table. With each card, you give the spectator a choice saying "duck" or "deal". "Deal' means you deal the card onto the tabled pile. "Duck" means you duck it under the next card, then deal both onto the tabled pile. You deal however the spectator requests. You then turn the cards face up, showing that they are in perfect 1 through 10 order!

Props: 10 geo cards, 1 through 10, and rubber band to keep them together.

Secret: This is a simple but very effective deception! Although it seems like the order in which the cards are dealt varies with "duck" vs. "deal", in fact, it's the same either way!

At the beginning, the cards are in 1 through 10 order. When you mix them, give them a series of casual, single cuts, holding the faces of toward you. On the last cut, cut the one to the end.

Presentation: "We have cards with different shapes that are numbered 1 through 10. (Spread cards face up in your hands, showing them in order.) Would you like to examine them? (Offer cards to the spectator. As he reaches for them, pull them back toward you, saying) Thank you very much.

I will mix them up a bit. (Hold them faces toward you, giving them a few casual single cuts. On the last one, cut the one to one end, bringing the cards back to 1 through 10 order.) I've heard that you have great intuition. Is that true? Well, let's find out. I will deal the cards onto the table. With each card, you say 'deal', in which case I'll deal it face down onto the table like this. Or 'duck', in which case I'll duck (slide the top card under the 2nd card and set both onto the table) like this. Ready? (Spectator directs whether you deal or duck each card until you've put all 9 in a pile on the table.)

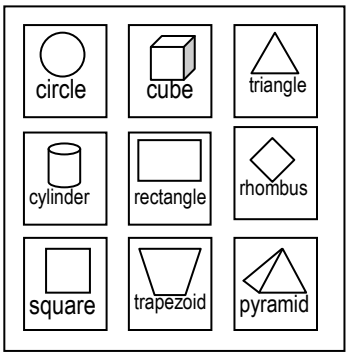
Now you decided each time whether to deal or duck, right? What I can't figure out is how you got them in perfect order! (As you say this, deal the cards face up 1 at a time in a row, showing them in 1 through 10 order.)

Challenge Versions: 1. You can go through the packet twice before showing the cards in order. (I.e. after the packet has been dealt, pick it up and repeat the deal or duck procedure.) 2. Use 2 packets of 1 through 10. Start with each in the same order. Set 1 aside. The other, have spectator go through deal or duck twice. Then each of you takes a packet and simultaneously deal each card face up, showing that both packets are in identical order.

Name That Shape (Extra)

Effect: You introduce your partner, the great mind reader of geometric shapes, who you send out of the room. You lay out 9 geo cards in 3 rows of 3 and ask a spectator to touch one. You call the mind reader back in, and you touch each card in order, asking, "Was it the square, the circle, the rectangle,...?" The mind reader correctly identifies the chosen shape!

Props: Any 9 of the geo cards, and a rubber band to keep them together.



Secret: Where you point to in the middle card tells the mind reader which shape was chosen. In the example in the diagram, the middle card is the rectangle. So, e.g. if you touch the upper left corner of the rectangle card, the mind reader knows the upper left card was selected—the circle. If you touch the bottom in the middle on the rectangle card, the mind reader knows it was the trapezoid. If you touch the rectangle card in the middle, it's the rectangle. So as you point to each card, the mind reader focuses on when you touch the rectangle, where in the card do you touch it. Where you touch the other cards is irrelevant.

Presentation: "Are you familiar with different geometric shapes? I have cards here with different shapes. For instance, there is a circle, a cube, a triangle, etc.

I would also like to introduce you to The Great Swami. He has great mental powers. I will ask one of you to touch any shape while Swami is not looking, and Swami will know which you picked. Do you think he can do that?

Swami, please leave the room. Who would like to come up here and touch an shape. You! Which one will you touch? Does everyone see it? Only the greatest of Swamis can get that one. We'll see if ours is up to the task. Swami! (Swami comes back in.) A round of applause for the great Swami, ladies & gentleman.

Swami, this person chose a shape. Was it (pointing to each shape, in turn) this one, this one, …or this one? (Swami ponders a moment, then names the shape.) Was he right? A round of applause for the Great Swami!"

Performing Tips:

- Be sure everyone in the audience sees which shape was selected.

Math Learning: Familiarity with geometric shapes and a key characteristic of each.

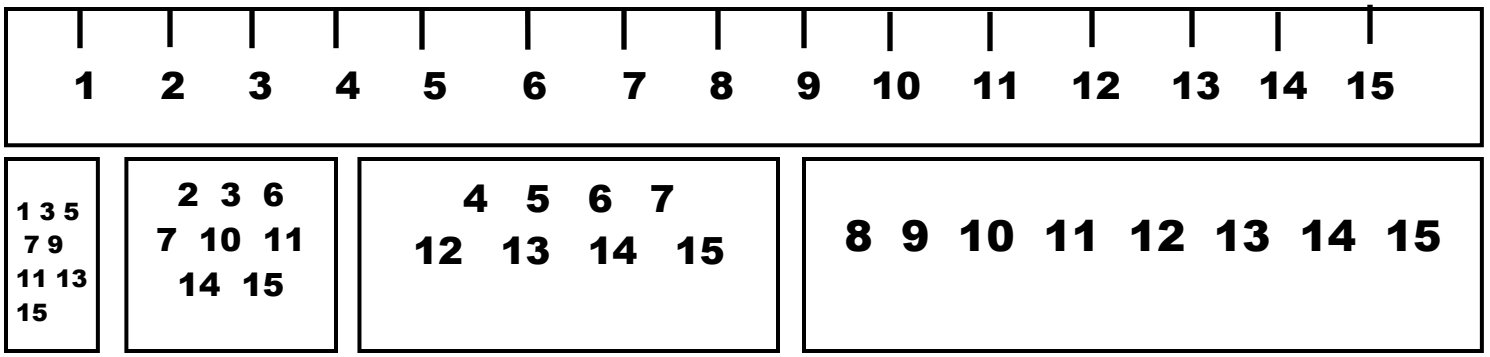
Digital Ruler

Effect: "Have you ever heard of a digital ruler? It's a very high tec piece of equipment. (You show a paper ruler numbered 1-15.) Let me show you how it works. Can you think of a number 1-15 but don't tell me what it is. Do you have one in mind? I'll turn around, and, if you would, point to it on the ruler so everyone knows your number. Does everyone know the number? (Yes)

Now, I have some pieces of paper. (You have 4, each with a different group of numbers.) Is your number on this page? On this one? This one? This one? (You ask if it's on each of the 4 papers. Whichever one(s) the number is on, line up those pieces next to each other beside the digital ruler. They will end at a number on the ruler—the number the spectator chose!) The ones you said it was on, we will set those down by the ruler. The ruler will tell me your number. Was it ___?" (You are correct!)

Props: A strip of cardstock with the 5 rulers (see below—not to scale), kids scissors, and a #10 envelope to hold the pieces.

Secret: Whichever of the 4 smaller sheets the number is on, line those up end to end beside the ruler. They will end at the chosen number!



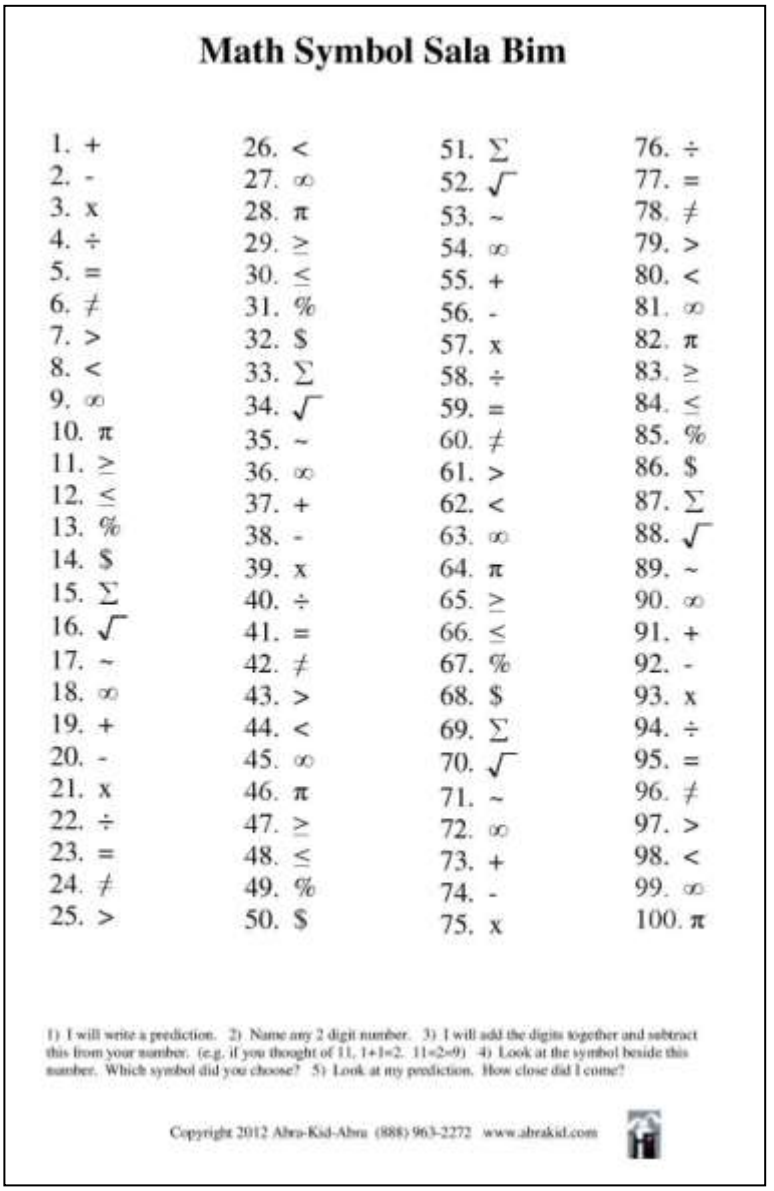
Challenge Version: Do this without using the long ruler! Add the first number of each ruler that the spectator says their number is on, and this tells you their number! E.g. if their number is in small rulers (above) 1, 2, and 4, add the first number on each of these rulers—1+2+8—and you get their number as 11.

Math Symbol Sala Bim

Effect: You show a sheet with lots of different math symbols. You point out several, then set the sheet down. You ask a spectator to pick any 2 digit number; add the digits together and subtract their total from his original number. (E.g. if he picks 43, 4+3=7. 43-7=36) You jot a prediction. The spectator notes the math symbol beside his number (36 in our example). You show your prediction: 36! You can repeat the trick with spectator choosing a different number and symbol.

Props: For each child: Math Symbol Sala Bim sheet, pad of paper, pen. For show: Larger (~11x17) laminated version.

Secret: There 17 different symbols on the page which rotate, but each multiple of 9 has the same symbol (infinity ∞). When you do the above math calculation, you always wind up with a multiple of 9. So you know which symbol will be chosen! On the back of the page is an identical set of numbers and symbols, except that there is a different symbol on the multiples of 9 ($). So if you casually turn the sheet over, the trick can be repeated with spectator choosing a different symbol.



Math Symbol Sala Bim

1. +	26. <	51. Σ	76. ÷
2. -	27. ∞	52. √	77. =
3. x	28. π	53. ~	78. ≠
4. ÷	29. ≥	54. ∞	79. >
5. =	30. ≤	55. +	80. <
6. ≠	31. %	56. -	81. ∞
7. >	32. $	57. x	82. π
8. <	33. Σ	58. ÷	83. ≥
9. ∞	34. √	59. =	84. ≤
10. π	35. ~	60. ≠	85. %
11. ≥	36. ∞	61. >	86. $
12. ≤	37. +	62. <	87. Σ
13. %	38. -	63. ∞	88. √
14. $	39. x	64. π	89. ~
15. Σ	40. ÷	65. ≥	90. ∞
16. √	41. =	66. ≤	91. +
17. ~	42. ≠	67. %	92. -
18. ∞	43. >	68. $	93. x
19. +	44. <	69. Σ	94. ÷
20. -	45. ∞	70. √	95. =
21. x	46. π	71. ~	96. ≠
22. ÷	47. ≥	72. ∞	97. >
23. =	48. ≤	73. +	98. <
24. ≠	49. %	74. -	99. ∞
25. >	50. $	75. x	100. π

1) I will write a prediction. 2) Name any 2 digit number. 3) I will add the digits together and subtract this from your number. (e.g. if you thought of 11, 1+1=2. 11-2=9) 4) Look at the symbol beside this number. Which symbol did you choose? 5) Look at my prediction. How close did I come?

Presentation: "What do you like to do in your spare time? In my spare time, I like to study math symbols. I have a chart here with a bunch of them—plus, minus, equal, greater than, pi,… We're going to use this chart in a moment, but first I'm going to jot a prediction on this slip of paper (do so—jot ∞).

I'd like you to name any 2 digit number. (e.g. 47. Jot it on your paper or the board.) OK, 47. When we add the digits together we get 11, right? (Jot 11 beneath 47.) Let's subtract these two to arrive at a final number. 47-11=36.

Would you look on the chart and say out loud what symbol is at—what number did we wind up at—36? (infinity) Infinity? You picked infinity? No one has ever picked that symbol before…Fortunately (unfold you prediction and show it) that is the symbol I predicted!"

If you like, start to take the symbol sheet away, then, as an afterthought, say that maybe you were lucky. Would they like to try it again? (yes) Put sheet back up, having subtly turned it around. Repeat the above.

Math Learning: 1) Learn a variety of math symbols. 2) Adding (the 2 digits in a 2-digit number.) 3) Subtracting.

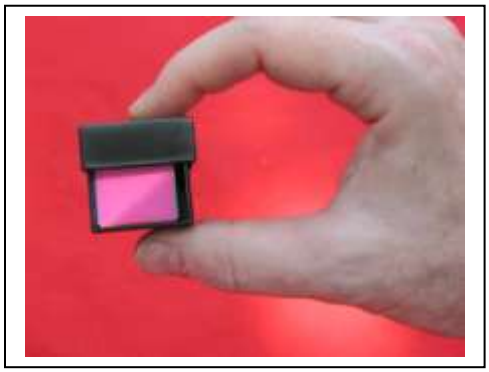
Number Vision Box

Effect: Show a box in which there is a cube with a different number on each side. While your back is turned, spectator is asked to put the cube in the box such that a number of spectator's choice is on top. Then close the lid. You put the box behind his back, shaking the box, then hold it up to his ear to hear the number. You then put the box behind his back and correctly announce the chosen number!

Props: Number vision box, cube, and several black and a couple white sharpees.

Preparation: With the sharpees write a different number 1-6 on each side of the cube. Use the black sharpee for all sides except black—use the white sharpee there.

Secret: Behind your back, you remove the lid and put it on a different side of the box. (See diagram.) When you shake it by your ear, you see the chosen number, though to the audience, nothing appears awry. When you put the box back behind your back, close up the lid, so all will be normal when you bring it back out.



Presentation: "Inside this box is a cube with 6 different numbers. I'm going to turn around. Would you select 1 of the numbers, show it to the audience, put the cube in the box so your number is facing up, then put the lid on the box. Let me know when you are done. (Take the box from spectator. Start shaking it as you put it behind your back & move the lid to a different side.) Did you know that different numbers have a different sound? I have a very well developed sense of hearing. I'm going to listen to the box. (Put it by your ear, glancing casually at the number.) Ah ha, very interesting. (Put it back behind your back & put the lid back on the normal side.) Was it…4 (name the number you saw)? Thank you.

Tips:

- When bringing the box out from behind your back to glimpse the number, pass it in front of your eyes en route to your ear, so you'll easily see it. (I.e. if box is in your right hand, pass it front of your eyes and shake it in your left ear.)
- Be sure as you bring it behind your back not to flash the number visible on the cube.
- You can repeat this trick.

Arithma-Trick Betchas (Class)

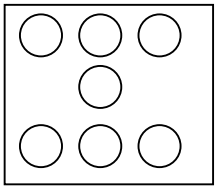
1. Four

How is the number four unique from all other numbers?

4. Stamp Collection

If there are twelve 1-cent stamps in a dozen, how many 2-cent stamps are in a dozen?

2. 12 Five Ways



Can you put #s 1-7 in these circles so each row, the column, and the 2 diagonals each total 12?

In the show, students can hold placards.

5. Triangular Problem

A triangle's sides are 4, 6, and 10 inches. What is its area in square inches?

3. Writing 1000

Can you write "1000" without the pen leaving the paper?

No marks should be visible connecting the numbers. And the pen must make a mark whenever it moves across the paper.

6. Groaners

a. If you take 12 apples from 17, how many do you have?
b. My math powers are so vast, that I can have you think of any number, do a series of calculations, & I can tell you the answer. Ready? Think of any number. Double it. Add 10. Subtract 1. I will now concentrate and tell you the answer.
c. A cowboy rode for 24 hrs to get to the nearest town. It also took 24 hrs to ride back to the ranch. Yet he did it all on Sunday. How can this be?

How to Do Betchas

Props needed: toothpicks, paper, pencil.

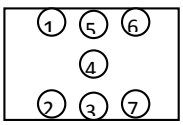
Divide kids into 2-4 groups. Tear off a different betcha above for each group. Allow a few minutes to solve. Visit groups. Help as needed. Have groups present their betcha to the class, or have kids mingle, sharing with others from different groups.

Repeat with round 2 if time permits. Or show remaining betchas to the class. Let them try to solve before revealing the solution. The first 3 take longer. The last 3 are quicker.

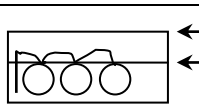
Solutions

1. It's the only number with the same # of letters as its number (4).

2.



3. Fold the paper. Draw "1000".



4. 12.
5. 0. 4+6=10. It's flat.
6 a. 12 b. "the answer"
c. the horse's name is Sunday.

Cards in Envelope

Effect: Magician deals the cards into a pile. Spectator says stop at any time. They count the cards in the pile. Spectator then examines 2 envelopes which magician tosses out, and chooses 1. Magician places the pile of cards in the envelope & instructs the spectator to sit on it. Magician announces he will cause 3 cards to travel from the deck into the pile beneath the spectator. Magician riffles the deck 3x. Spectator pulls out the envelope, and counts the cards to find 3 more than were there previously!

Props: Deck of cards & 2 #6.75 envelopes

Secret: Magician has 3 extras cards beneath the 2 envelopes. When magician tosses the envelopes out, he tosses them casually onto the pile, adding 3 cards to the pile. The rest of it is all presentation!

Presentation:
Come out with deck in left hand & the 2 envelopes fanned in the other, with 3 face down cards hidden beneath them. Set the 2 envelopes so they and the hidden cards hang over the edge of the table a bit, making it easy for you to pick up without fumbling.

"I have here an ordinary deck of marked cards. Would you like to examine them? (offer them to spectator. As he reaches for them, pull them back, saying) Thank you very much.

I'll deal the cards into a pile. Can you say stop whenever you like. (Deal 4-5 cards as you're talking, so that by the time you are done & he can stop you, you've already dealt 4-5 cards. You don't want a 1-2 card pile! Deal fairly sloppily.) Right there? Are you sure you don't want me to deal more? OK. (Set rest of the deck aside.) Let's count together how many cards we have. (Deal them sloppily, so that when you add the extra cards, it won't be noticeable. State the total when you are done clearly.)

(Pick up the envelopes & toss them casually onto the pile, with extra cards beneath them.) I brought with me 2 envelopes. Would you examine them. Make sure there are no trap doors, secret compartments, or mirrors. Would you choose 1 of the envelopes to use. Very well. Set the other 1 aside. (Take the 1 they picked, square up the pile of dealt cards, & put the pile into the envelope.) We'll put the cards into the envelope, and would you sit on them. Now if I were to try to get to the cards using some sort of sleight of hand, you would definitely know it, right?

I will now attempt to make 3 cards travel from the deck into your pile. (Riffle the end of the deck.) That was the 1st one. Did you feel anything go in there? No? Let me try it again. (Riffle again.) That was the 2nd card. Did you feel it that time? Still no. (Riffle once more) And now 3 cards have left the deck & gone into your pile. Would you like to count them? (As spec starts to get the cards out, stop her, saying) Wait a minute. Before we do that, I will now make the cards **go back** from your pile to the deck. That would really be impressive wouldn't it? You look a little skeptical. If 3 cards really went into your pile, how many should you now have? Would you get off the cards, pull them out of the envelope, and count them **out loud** onto the table. (Count the last 3 with her to emphasize that 3 have come over.) Thank you."

Tips: Why use 2 envelopes? If you just used 1, you'd logically hand it to the spectator. But with 2, it's reasonable to toss them out & have the spectator pick one. 2 also provides a little confusion. Use 2.

Math Learning: Adding. The magician must add 3 to a variety of numbers mentally & quickly.

4 x 4 Cards

Effect: Magician lays out 4 rows of 4 cards face up on the table (16 cards total). She asks spectator to pick a card, and asks which column it is in. Magician then scoops up the cards, deals them into 4 rows of 4 again, and again asks spectator which column her card is in. Magician then picks up the cards and deals them onto the table, turning them face up one at a time. Magician proclaims that the next card she turns over will be his card. Spectator doesn't think so, because magician has already passed it! Magician digs down into the pile of dealt cards & turns over the spectator's card!

Props: Deck of cards.

Secret: When spectator announces the column his card is in, magician knows it is 1 of 4 cards in that column. The 2nd time the magician deals them, she puts each of the 4 cards in a different column (same row). So when spectator says which column his card is in the 2nd time, the magician knows what it is!

Presentation: Deal the cards into 4 columns of 4. As you deal, always deal across (i.e. 4 in the 1st row, 4 in the 2nd row, etc.). Cards in a column should overlap each other, which makes it quicker to scoop up all 4 cards in a column.

Ask spectator to think of a card. If there is more than 1 person watching, turn your back & ask spectator to point to a card so everyone in the audience knows which it is. Turn around to face spectator and ask which column it is in. Scoop the columns up in order, and deal the cards out again as above (1st row, 2nd row, …). Now, when spectator tells you which column his card is in this time, you know the card. E.g. if the first time it was in column #1, the 4 cards in column 1 will, the 2nd deal, be the top cards of columns 1-4. So if spectator says it's now in column #2, you know which card it is!

Note the spectator's card. Scoop up all the cards into a face down pile & start dealing, turning the cards face up 1 at a time as you deal. Go a few past the spectator's card so he thinks you muffed it. Say you bet the next card you turn over will be his card. Go back into the dealt pile and "turn over" spectator's card—to thunderous applause , of course!

Math Learning: This teaches about grids. You might ask when you have the 16 cards laid out: If I told you which row & which column my card is in, would you know the card? What if it is in the 3rd row, 2nd column? 1st row, 4th column? Etc.

So by knowing 2 things, which row & which column, you can pinpoint the card! That's how this trick works. We ask which column it's in. If we asked which row, that would be too obvious. So we disguise it & ask, the 2nd time, which column. We're really asking which row & they don't realize it!

What If… Can you do this with a 3x3 matrix? 5x5? 2x2? Why don't we us 2x2? (Too obvious, too few choices, not very magical.) Why not 5x5? (Too long, bores audience.) 4x4 is a good balance—enough cards to make for a mystifying trick, but not so many that people get bored with the dealing.

Can you do it with a 4x3 matrix? (No, it gets messy. Much cleaner with same # in the row as the column.)

4 Card Prediction

Effect: You show 4 double sided cards, and a face down prediction card. You demonstrate how there are a variety of different number combinations that can be face up, depending on which cards are facing which way. You set the 4 cards on the table in a row, and ask a spectator to flip any 2 of them over while you look away. Then total the 4 face up values. What's the total, you ask, and your prediction card will match. 14, the spectator says. 14? But there is no such thing as a 14 card. There must be some mistake. The prediction card is turned over and sure enough, it is a 14!

Props: Set of 5 cards printed on business card stock: 4 double sided cards, a 14 card (with a printed back), and a rubber band to keep the 5 cards together. The double sided cards are: blank-5, A-6, 2-7, and 3-8.

Secret: Start with the lowest 4 values face up: blank, A (1), 2, & 3. No matter which 2 the spectator flips over, the resulting total of the 4 face up cards is always 14!

Presentation:
"Do you believe in ESP, STP, or anything like that? I have 4 cards, and a prediction card, which I'll set face down off to the side. These 4 cards have numbers on both sides. (Show them casually, but try not to make it obvious that 1 side is always 4 higher than the other.) Depending on which sides you put face up, lots of different totals are possible. For example, this totals 6 (blank, A, 2, & 3.) If you this one over, it totals 10. If you turn these over (turn over a couple more, it totals higher numbers than I can count to. Etc.

(Set in a row face up on the table: blank, A, 2, & 3.) I am going to look away. When I do, I'd like you to flip over any 2 of these cards. Then let me know you're done. Ready? Go. (As you look away, spectator turns over 2, and says he's done.) That was awfully quick! Can you total the 4 face up cards, then put them in a pile. Do you have a total? (yes) (Turn back toward spectator.) Now remember before the trick began, I set out a prediction card. Out of all the different numbers possible, whatever number you have, the total will be on this card. And I should mention, by the way, in case you got a high total, that jack is worth 11, queen is 12, and king is 13. For the first time, when you add these cards up, what total do you get? (14) Very funny. I see you have a good sense of humor! Now seriously, this is no time for jokes. When you add the 4 face up cards together, what number do you get? (14) May I see the cards, please. (Spectator spreads them out. You add out loud. E.g. 0+1=1, +6=7, +7=14) I've never had anyone come up with 14 before! (Turn over your prediction card.) Fortunately, it worked this time!"

Notes:

- Sell the audience on the idea that all sorts of value combinations are possible (as you turn various numbers face up and face down in your hands). And, by extension, there are various different totals possible. You can't show many different totals because only 4 are possible: 6, 10, 14, & 18, and you want to de-emphasize the 14 & 18, implying at the end that you were expecting a number king (13) or lower. So you show a couple and infer it.

Learning: Why is the total the same, regardless of which 2 cards they turn over? Each card on the other side is 4 higher. The cards on side 1 total: 0+1+2+3=6. No matter which 2 are turned over, the value is going to be 4+4=8 more, or 14.

Math Skills: Mentally adding various combos of different numbers.

Butterflies

Effect: You show 2 cardboard caterpillars that are the same size. One becomes bigger than the other, and vice versa. You then show that they are the same size. Finally, they are turned over to show a picture of the butterfly they turn into!

Props: For each child: 2 cardboard pieces with caterpillars on 1 side and a butterfly on the other. For show: 1 pair of larger butterflies.

Secret: When you hold 1 piece below the other, there is an optical illusion that the lower piece appears longer. When you put them one right on top of the other, they are seen to be the same size.

Presentation: "Once upon a time, there were 2 caterpillars. They were brothers born at the same time. (Show piled on top of each other—same size.) The green one wanted to be bigger. So he drank lots of milk, and he ate his fruits and vegetables. (Pretend to stretch the green one) and became bigger than his brother. (Place green one on the table below the red one, so green one looks bigger. Photo #1) But then, the red one didn't like being smaller, so he drank lots of milk and ate his fruits and vegetables. Then he became bigger than his brother. (Stretch red one, then set it below the green one on the table.) They both kept eating and finally they both became the same size. From eating all their fruits and vegetables, do you know what finally happened to the caterpillars? They turned into a beautiful butterfly! (Turn both over, and position them to show 1 butterfly—photo #2.)

Tip: Line the heads up (i.e. the left edges up) of the 2 boomerangs. This makes their apparent difference in size look more pronounced.

Photo 1. The one below looks larger.

Photo 2. For the finale of the story, turn them over. The caterpillar changes to a butterfly.

4 Square Puzzle

Challenge: Can you put the 4 (identical red plastic) pieces together to form a square?

Props: 4 red plastic puzzle pieces (each the same shape); ziplock sandwich bag to hold them.

Solution:

Hints:

1. There is a little circle in the middle of each piece that you can feel with your thumb. Make sure it is up on each piece (or down on each, if you prefer). This puts all pieces right side up.
2. Each piece kind of looks like a tent. The tops of the tent all point in the the middle.

Pocket Puzzlers (Camp)

The 6 Object Swami

Effect: You introduce your assistant, who has great mental powers. You send her out of the room, and ask someone to touch any of 6 different objects that you have lined up on the table, so everyone knows the selection. You call your assistant back in and after some concentration, she reveals the chosen item!

Secret: The number of words you use to call Swami back in clues her as to the item. E.g. "Ready!" means the 1st item. "Come in!" means item #2. "We are ready, come back in" denotes item #6… Agree with Swami in advance on which end you count from. Having Swami concentrate, look at the spectator, put hands over the items, etc. adds to the fun!

Math Learning: Counting.

Substraction Stunner

Effect: You jot a prediction, which you set aside. You ask a spectator to write **any** 3 digit number where the digits are in sequence, 1 after the other. E.g. 123, 567, 789, etc. She does so. (e.g. 234) "Any particular reason you chose that one?", you query. Then you ask her to reverse it, writing the bigger number above the smaller. (E.g. 321.) You subtract.

```
 432
-234
 198
```

You turn over your prediction. It says 861. Uh oh, it's wrong! But wait a minute, you state. You had it upside down. You turn it upside down and it says "198", matching the total they got!

Secret: The answer is always 198! Let's try another. 654-456=198!

Math Learning: Practice subtracting.

Notes:

Why is the answer always 198? Have the kids, in small groups or individually, each try a different possibility. E.g. 321-123. 432-234. 543-345….987-789. What answers do you get? Why is it the same? When you reverse a 3 digit # that's all in seuqnece 1 after another, the difference is always 198.

In presentation, messing up--861--then realizing it's upside down and getting it right is fun. Be sure to play this up!

For Younger Kids: You can also do this with 2 digit #s in sequence. E.g. 78 & 87. 87-78=9, which is what the answer will always be with 2 digit #s. This is a work-around if the kids have trouble subtracting 3-digit numbers, but can subtract 2-digit ones.

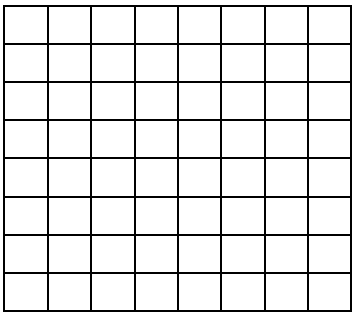
Extra No Prop Math Pocket Puzzlers

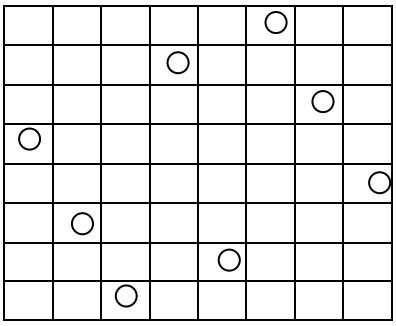
8 Queens

Draw an 8x8 grid (see diagram # 1). Challenge: Can you place 8 pennies (or other small objects—bits of paper or whatever) on the grid such that no 2 are in the same row, column, or diagonal? Each object occupies a different square.

Props: Pencil and paper.

Note: There are multiple answers. One is pictured here.





How Many Sides?

Activity: From an 8.5x11 paper, cut a strip ~1"x11". Bend it into a loop, make 1 twist, and tape it, forming a ring with 1 twist in it. Ask how many sides your loop of paper has. Paper has 2 sides, right? But the correct answer with this piece is 1! How is that? Draw a line, going all the way around the loop. You'll see that (because of the single twist), it makes 1 single line, ending where it starts! Which shows that you have, indeed, a 1-sided piece of paper! This is called a Mobius Strip, named after the mathematician who discovered it.

Props: Paper, tape, pen or pencil.

Calculating the Answer

Claim that you have such great mental math abilities that your friend can give you any 2 numbers, you will multiply them in your mind, without using any other items, and tell him the correct answer. Does he think you can do that? Your friend thinks of 2 numbers and multiplies them—either on paper or using a calculator. He sees the answer. He tells you the numbers. E.g. 462 x 597. You concentrate briefly and say "the correct answer". This is a play on words. You don't solve the problem. You said you'd tell him "the correct answer"!

Note: You can also do this with adding (or any operation). Use several #s if you'd like. E.g. 1976 + 586 + 93

Props: None.

Can you arrange 8 4's so they total 176?

You can put them together in any configuration: e.g. 444, 4444, etc. You can also provide a hint if you wish: This just uses adding. Answer: 44+44+44+44 = 176!

Props: Paper & pencil.

Can you arrange 5 6's so they total 19?

Answer: 6+6+6+6/6 = 19!

Props: pencil & paper.

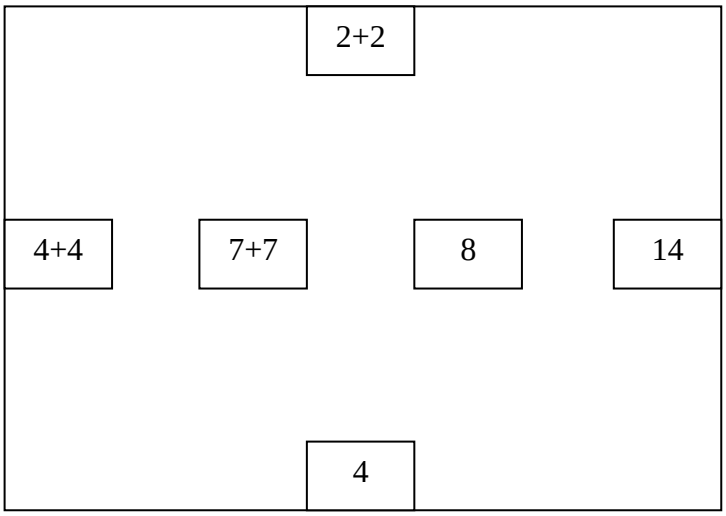
Connecting the Math Boxes (art-camp)

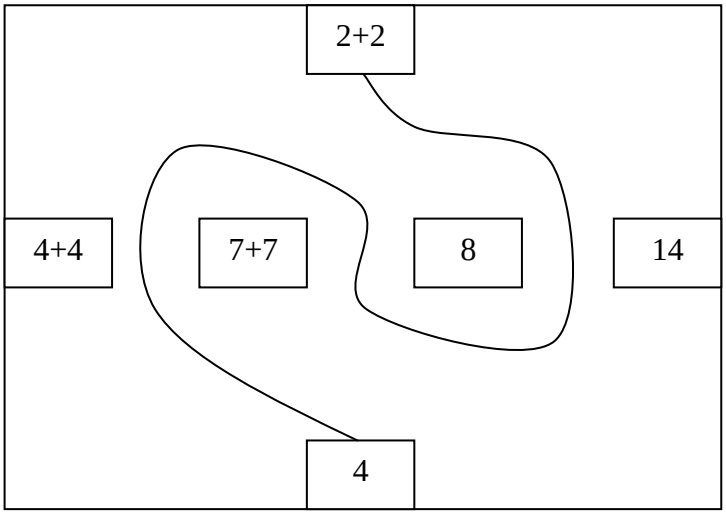
Challenge: In figure 1 below, which answer goes with which problem? Can you draw 3 lines connecting the problem to their correct answer—but the lines cannot cross!

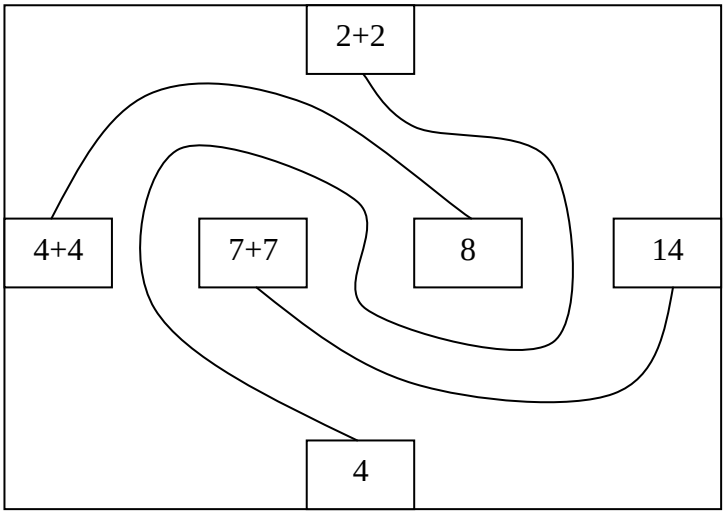
Props: For each child: a Connect the Math Boxes Sheet, and a pen or pencil.

Secret: Let them try it for a while before revealing the secret. As in figure 2 below, connect the top & bottom boxes with a line that winds around as shown. Then, as shown in figure 3, connect the other 2 pair of boxes!

Doing this Activity: The goal is for the kids to be able to write this on their own on a blank sheet, so they can show it. The Connect the Math Boxes Sheet has 4 boxes. After they solve the first one, have them write their own problems & answers in the 2nd box. Make sure they heed which boxes the problem & its respective answer need to be in, otherwise the trick won't work. Finally, have them draw the 6 boxes, problems, & answers themselves in a blank box—showing they can write this puzzle on their own.







Walking Through a Note Card (art-camp)

Effect: You ask if anyone can cut a notecard so they can walk through it. You demonstrate that you can!

Props: Scissors, 4x6 note card (or piece of paper—notepad size or 8.5x11), & this instruction sheet.

Secret:

1. Fold the paper in half along dotted line in figure 1.
2. Make several cuts from the folded middle to 1/2" from the outside edge. (Figure 2)
3. Make several cuts from the outside edges to 1/2" from the folded middle (Figure 3—dotted lines). Make sure that both outer cuts start from the folded middle (as is the case in fig 3)
4. Unfold the paper flat. Cut down the center of the folded line—the dotted line in Figure 4.
5. The result is a paper you can put over your head, or walk through. The more cuts, the larger the opening.

Figure 1

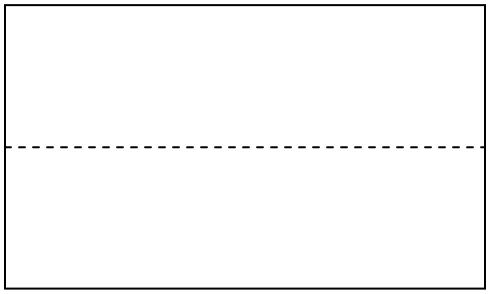


Figure 2

Outside edge →

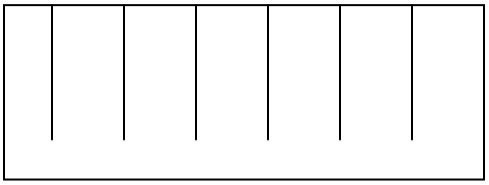


Figure 3

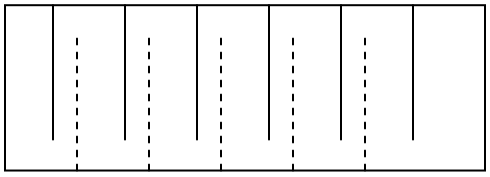
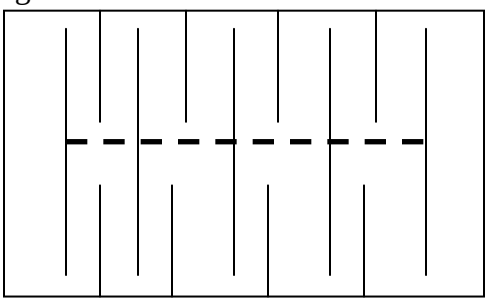


Figure 4



1. Unusual Number

What is unusual about this number?

1961

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2. Eating Apples

A boy had 5 apples and ate all but 3. How many did he have left?

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3. Making 7 Even

How do you make 7 even?

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4. A Sure Quarter

Bet a spectator that she cannot tear a sheet of paper into 4 equal pieces. If she can, you'll give her a quarter. She does. What do you do?

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5. Taking Away = Larger?

What's the only thing that gets larger the more you take away?

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6. Folding a Paper in Half 8x

How many times do you think you can fold a sheet of paper in half? Think you can fold it in half 8 times? Betcha can't.

After you've done your folds, do you know how many thicknesses of paper you are folding in the 8th fold?

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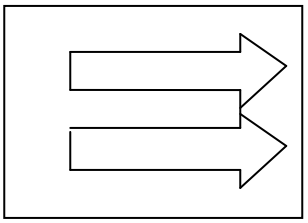
7. The 3rd Arrow

Challenge: In the below diagram, can you add a 3rd arrow? However, you can only draw 2 straight lines!



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8. Creating an Odd Number

Number 4 slips of paper 1-4. On 3 more slips put a "+" on 1 side and a "-" on the other.

Challenge: Using all the numbers, 1-4, and putting + or – between each, can you make an equation that yields an odd number?

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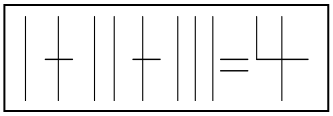
9. I+II+III=4?

Write this equation, or make it with toothpicks.

Challenge: Can you move 1 line (or toothpick) on the left side of the equation to make it true?



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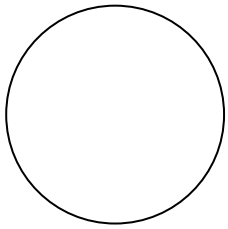
10. Pancake Cut

Challenge: Can you cut a round pancake into 8 pieces with 3 straight cuts?



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Solutions 1A

1. It's the same upside down.
2. 3
3. Take away the "s" (seven).
4. Give her 1 of the 4 pieces (a "quarter').
5. A hole.
6. It's impossible to fold a paper in half 8x. # of folds: 1st: 1. 2nd 2. 3rd 4. 4th: 8. 5th: 16. 6th: 32. 7th: 64. 8th: 128. No wonder you can't fold it 8x!

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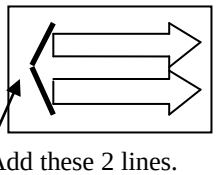
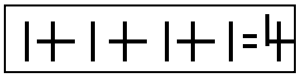
Solutions 1B

7. 
Add these 2 lines.
8. No, it can't be done.
9. 
Take a "I" from "II",turn it sideways & put over the middle "1" in "III": "I+1".
10. Make 2 perpendicular cuts, making 4 pieces. Stack them in 1 pile & make 1 more cut.

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11. Largest 2 Digit

What is the largest number that can be made using only 2 digits?

12. 1 Pint Problem

You have a 3 pint container, a 2 pint container, and a sink. Can you get 1 pint using these? If so, how?

13. Stamp Collection

If there are twelve 1-cent stamps in a dozen, how many 2-cent stamps are in a dozen?

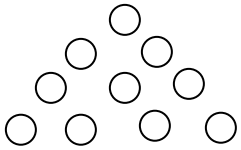
14. Cards Vs. Cubs

The Cards and Cubs played 5 games. Each team won 3. There were no ties. How is this possible?

15. Jumping Jacks

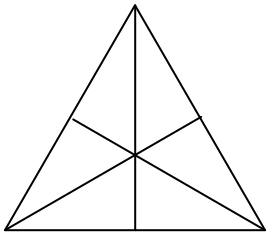
Claim you can do between three and four hundred jumping jacks in just 10 seconds. How?

16. Equilateral Balls

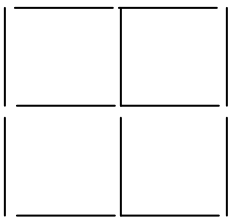


You have 6 red balls, 4 blues ones, and a triangle with space for 10 balls. Challenge: Can you put the 10 balls in the 10 spaces such that no 3 red balls form an equilateral triangle?

17. How Many Triangles?



18. Square Deal



Use 12 toothpicks to form 4 squares as above. Challenge: Can you remove 2 & have 2 squares left?

19. Birthday Candles

When Julie was 1 year old, she had 1 candle on her cake. When she was 2, she had 2 candles, etc. In her life so far, she has had 10 total candles on her cakes. How old is she?

Challenge Question: Julie's brother, Steve, has had 55 candles on all of his birthdays. How old is he?

20. Sign Painter

A sign painter has to paint numbers on 25 homes, consecutively from 1-25. How many 1's will he paint?

Solutions 2A

11. 99

12. Fill the 3 pint, pour it into the 2 pint. 1 pint remains.

13. 12

14, They didn't play each other.

15, Do 5. It's between 3 and 400!.

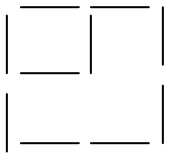
16.

R
b b
R R b
R b R R

Solutions 2B

17. 16 triangles: six singles, six 3-triangles, one 6-triangle, three 2-triangles.

18.



19. Julie is 4. Steve is 10.

20. 12: 1, 11, 12, 13, 14, 15, 16, 17, 18, 19, & 21.