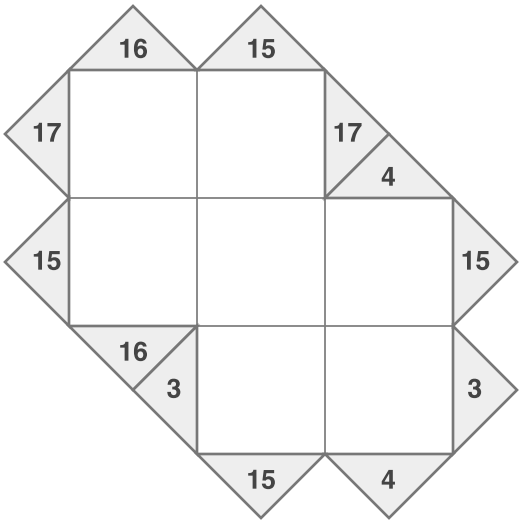
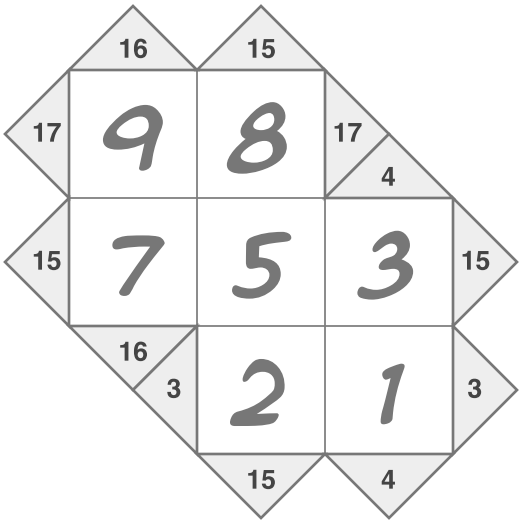
THE RULES OF KAKURO

Before tackling Krypto Kakuro, you should have first solved some Kakuro puzzles. You'll find some free Kakuro puzzles on my website, Krazydad.

A Kakuro is made up of *sets** which are analogous to words in a normal Crossword. Each set is from 2 to 9 cells in length, and each cell (or square) in the set contains a digit, from 1 to 9. The triangular clues on both sides of the set indicate the sum you get when you add the digits together.

Digits may not repeat within a set. For example, if the clue on a set says 4, then it may contain 1 and 3 (in either order), but it may not contain 2 and 2. Likewise, if a set is nine cells in length, it must contain all the available digits 1 though 9 (and the clue/sum will always be 45).





You'll find a printable Kakuro tutorial that includes various solving strategies on my website at

krazydad.com/kakuro

* Puzzle nomenclature is not standardized. Other authors may use any of the terms *entry*, *block*, *container* or *cage* to refer to what I'm choosing to call a *set*.

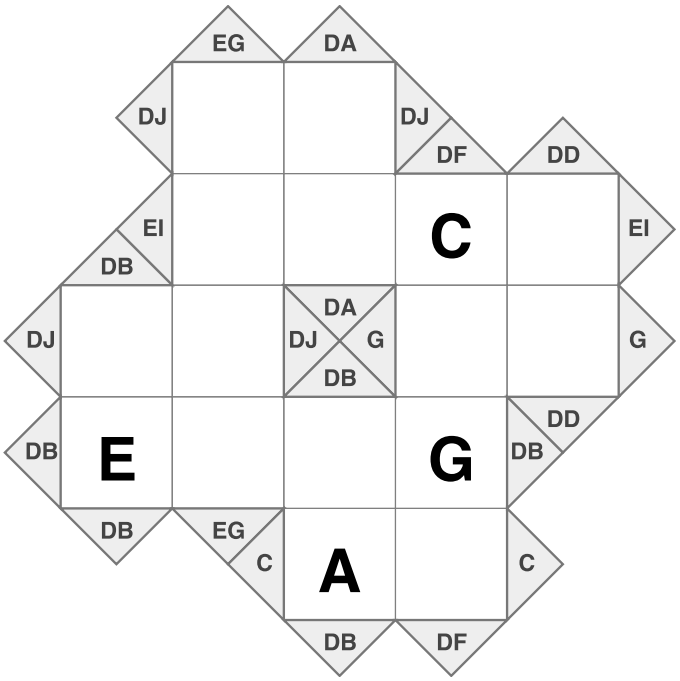
THE RULES OF KRYPTO KAKURO

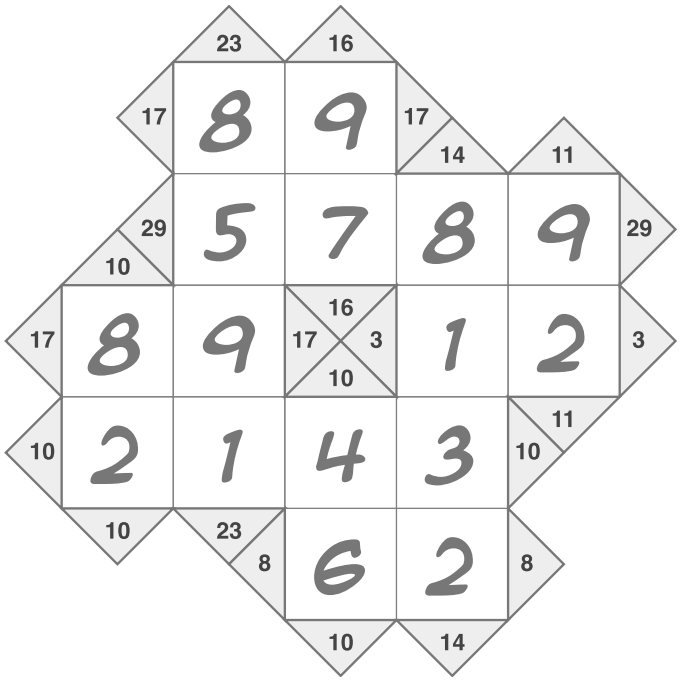
A Krypto Kakuro puzzle is a regular Kakuro puzzle in which each digit shown on the puzzle has been replaced by a letter. So for example, all the 1s might be shown as D while all the 2s shown as E, all the 3s as G etc. The choice of letter is random, but all instances of the same letter will always indicate the same number.

In addition to the encrypted clue-sums, a few cells of the puzzle are usually shown as well (in encrypted form), as additional clues to aid in decrypting / solving.

Other than the encryption, all the rules of regular Kakuro apply.

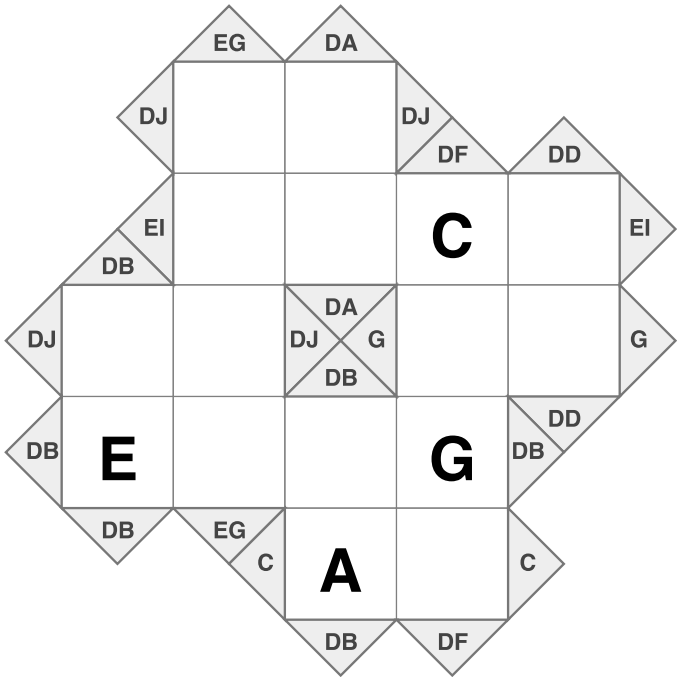
You will find that it is best to go back and forth between decrypting the puzzle, and partially solving the Kakuro, rather than attempting to decrypt it completely before solving the puzzle.





SOLVING KRYPTO KAKURO

We're going to solve the puzzle shown below (the same one from the previous page – let's pretend I didn't already show you the answer!). This puzzle uses the letters A through J, but we don't yet know how to decode any of the letters.



Each puzzle includes a letter->digit table, to aid your decryption efforts.

As we rule out possible digits for each letter, I'll put an x in the appropriate cell.

I'll use checkmarks to indicate decoded letters.

	0	1	2	3	4	5	6	7	8	9
A										
B										
C										
D										
E										
F										
G										
H										
I										
J										

First we can eliminate a lot of letters that can't have a value of 0.

The digits A,C,E,G appear in cells in the puzzle. Cells can only contain the digits 1 through 9, so these letters can't be zero. Also, the digit D appears in front of a clue, so it can't be zero.

Moreover, the digit D appears in front of a clue DJ, which is for a two-cell set. Therefore, D must be 1, since a two-cell set can't be higher than 9+8=17.

The digit E appears in front of a a clue EI for a four-square word. Therefore E must be either 2 or 3, since a 4-square word can't be higher than 9+8+7+6=30.

	0	1	2	3	4	5	6	7	8	9
A	×	×								
B		×								
C	×	×								
D	×	✓	×	×	×	×	×	×	×	×
E	×	×			×	×	×	×	×	×
F		×								
G	×	×								
H		×								
I		×								
J		×								

If you examine all the possible two-cell sets in Kakuro that sum to a single digit, you'll find that none of the cell digits can be higher or equal to the clue digit.

A related rule is that in a two-square set with a two-digit clue, (A+B=CD) none of the cell digits (A nor B) can be less than or equal to the second digit of the clue (D).

This means that for the clue

C = A + ?, A must be smaller than C.
DB = ? + A, A must be larger than B
DB = ? + E, E must be larger than B

Since B is less than A, and A is less than C, B must also be less than C.

Since B is smaller than three other digits, it can't be 7, 8 or 9.
C can't have the value of the lowest value of A or B.

Since B is less than E, we can rule out all but the values of 0 and 2 for B.

Also, you'll notice that G is used as a clue for a two-letter word. So G can't be 2 (since neither 22 nor 32 are possible values).

	0	1	2	3	4	5	6	7	8	9
A	×	×								
B		×		×	×	×	×	×	×	×
C	×	×	×							
D	×	✓	×	×	×	×	×	×	×	×
E	×	×			×	×	×	×	×	×
F		×								
G	×	×	×							
H		×								
I		×								
J		×								

Okay, this next one is a bit devious. There are two 4-letter clues that have a first letter of E.

EG = ? + ? + ? + ?
EI = ? + ? + ? + ?

We already know that E must be 2 or 3. However, there is only one possible clue in which E would be 3.

30 = 9 + 8 + 7 + 6

Since there are two unique clues that use the E, that means E must be 2. Having solved E, we can see that B must be 0, the only choice left for B.

	0	1	2	3	4	5	6	7	8	9
A	×	×	×							
B	✓	×	×	×	×	×	×	×	×	×
C	×	×	×	×						
D	×	✓	×	×	×	×	×	×	×	×
E	×	×	✓	×	×	×	×	×	×	×
F	×	×	×							
G	×	×	×							
H	×	×	×							
I	×	×	×							
J	×	×	×				×			

Since two letter clues can't be larger than 17, the second digit of a two letter clue can't be 8 or 9. This affects A and J

Since we have a clue that reads

DB = E + ? + ? + G

and we have decoded some letters, we know this corresponds to 10 = 2 + ? + ? + G

The only four numbers that can add up to 10 are 1+2+3+4. This rules out anything higher than 4 for G.

This next one is also a bit tricky. There's a clue in the puzzle that reads

G = ? + ?

Since we know G can only be 3 or 4, that means that one of the cells that add up to G must be a one, and the other must be 2 or 3.

G = 1 + ? OR G = ? + 1

We also know that the second cell in that equation is also the second cell in

DD = ? + ?

and we know that DD = 11. Therefore, that cell can't be 1 (because that would produce the illegal combination (1 + 10) so the first cell must be 1, and we can fill that it in the solution puzzle.

G = 1 + ?

Since the 1 is used in that position, we know that further down in the puzzle, where it says C = A + ?

That the ? can't be another 1, since that cell is in the same word that already contains a 1.

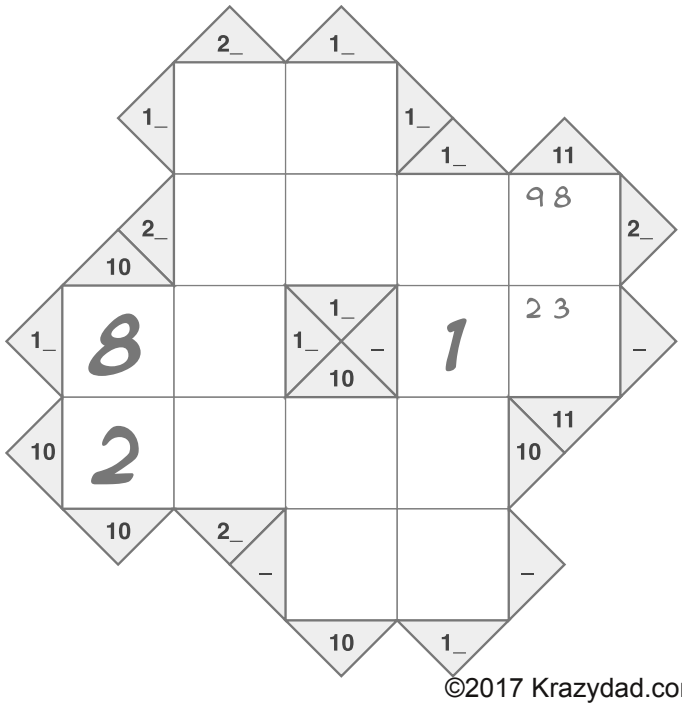
That means that C must be at least 2 greater than A.

Since A < C + 1, this rules out 4 as a possible value for C.

In the equation DB = ? + E we've solved B and E, and can fill in the blank as an 8.

This means that in the equation DJ = ? + ? the first blank is an 8, which means that J can't be 6, since that would produce 16 = 8 + 8, which is illegal (numbers can't repeat).

	0	1	2	3	4	5	6	7	8	9
A	×	×	×						×	×
B	✓	×	×	×	×	×	×	×	×	×
C	×	×	×	×	×					
D	×	✓	×	×	×	×	×	×	×	×
E	×	×	✓	×	×	×	×	×	×	×
F	×	×	×							
G	×	×	×			×	×	×	×	×
H	×	×	×							
I	×	×	×							
J	×	×	×				×		×	×



Note that possible values for the blank in DJ = 8 + ? are 5,6,7,9.

Now, for the clue DB = E + ? + ? + G, we already know that DB is 10, and that the numbers 1,2,3,4 must each be used in the word (because the only combination of 4 unique digits that add up to 10 are 1,2,3 and 4.

We've already ruled out 1 for the first and last square (E and G).

Now we can rule out 1 for the third square as well, because this is part of

DB = _ + A
or
10 = _ + A

And if the blank in that equation is a 1, then A must be 9, but we already know that A isn't 9.

That means the second square in DB = E + ? + ? + G must be the 1.

Since that 1 is also the last square in

EG = ? + ? + ? + 1

and we know that EG must be either 23 or 24, then the remaining three squares must add up to 22 or 23, which means that none of those squares can be less than 5, and one of those squares must be a 9 (based on the different combinations of 3 numbers that add up to 22 or 23).

At this point the third square in the expression

DB = E + ? + ? + G
has the possibilities 3 and 4.
This means that the A in

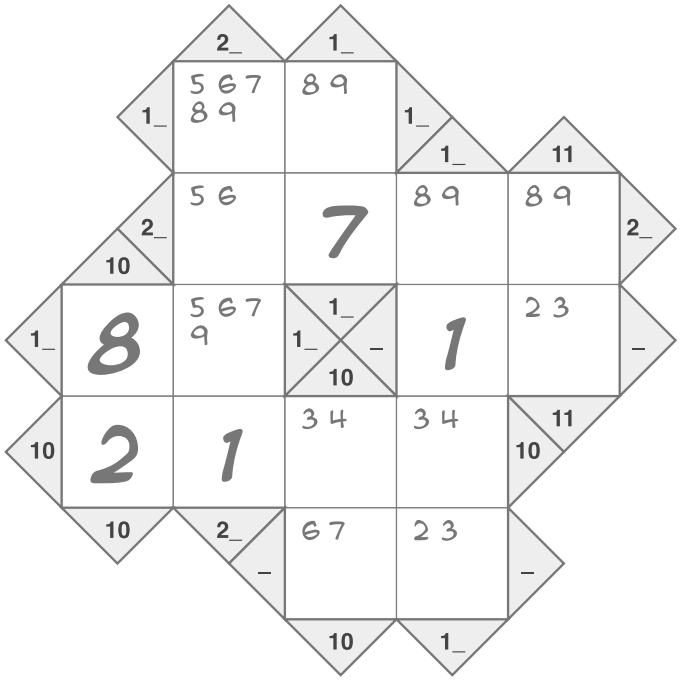
DB = ? + A
can only have the values of 6 or 7.
Because A < C + 1, we can further limit C as well, to 8 or 9.

	0	1	2	3	4	5	6	7	8	9
A	×	×	×	×	×	×			×	×
B	✓	×	×	×	×	×	×	×	×	×
C	×	×	×	×	×	×	×	×		
D	×	✓	×	×	×	×	×	×	×	×
E	×	×	✓	×	×	×	×	×	×	×
F	×	×	×							
G	×	×	×			×	×	×	×	×
H	×	×	×							
I	×	×	×							
J	×	×	×				×		×	×

Limiting A to 6 or 7 limits the possibilites of each of the squares in the clue (DA = ? + ?) to values of (7,8 or 9). The second square in that clue intersects a clue which reads

EI = ? + ? + C + ?

Having narrowed down the last two squares of that clue to values of 8 or 9, this means that it's second square must have a value of 7.



Now we can start narrowing down possible values for some of the sums, based on these combinations of digits.

One of the clues is

EG = (5,6,7,8,9) + (5,6) + (5,6,7,9) + (1)

Possible values are

23 = 8 + 5 + 9 + 1
23 = 7 + 6 + 9 + 1
23 = 9 + 6 + 7 + 1
24 = 8 + 6 + 9 + 1

This reduces the possibliies of each square to

(7,8,9),(5,6),(7,9),(1)

Because DJ = (8) + (7,9) we can reduce J to 5 or 7,

Another vertical clue reads

DF = (8,9) + (1) + (3,4) + (2,3)

Its possible range of sums is 14 thru 17, which means F can be limited to 4,5,6,7.

A horizontal clue reads

EI = (5,6) + (7) + (8,9) + (8,9)

This limits possible values of EI to 29 or 30. Since we know E is 2, I must be 9, and therefore C must be 8.

	0	1	2	3	4	5	6	7	8	9
A	×	×	×	×	×	×			×	×
B	✓	×	×	×	×	×	×	×	×	×
C	×	×	×	×	×	×	×	×	✓	×
D	×	✓	×	×	×	×	×	×	×	×
E	×	×	✓	×	×	×	×	×	×	×
F	×	×	×	×					×	×
G	×	×	×			×	×	×	×	×
H	×	×	×						×	×
I	×	×	×	×	×	×	×	×	×	✓
J	×	×	×	×	×		×		×	×

We can now fill in the clue (DD = 9 + ?) as (11 = 9 + 2) which gives us a value for G because G = 1 + 2.

If you've made it this far, you should be able to solve the rest of the puzzle fairly rapidly.

Filling out other squares in the puzzle, you will find that A must be 6.

The possibilities of the clue that sums to EG are now reduced to

23 = (7,8,9) + (5) + (7,9) + (1)

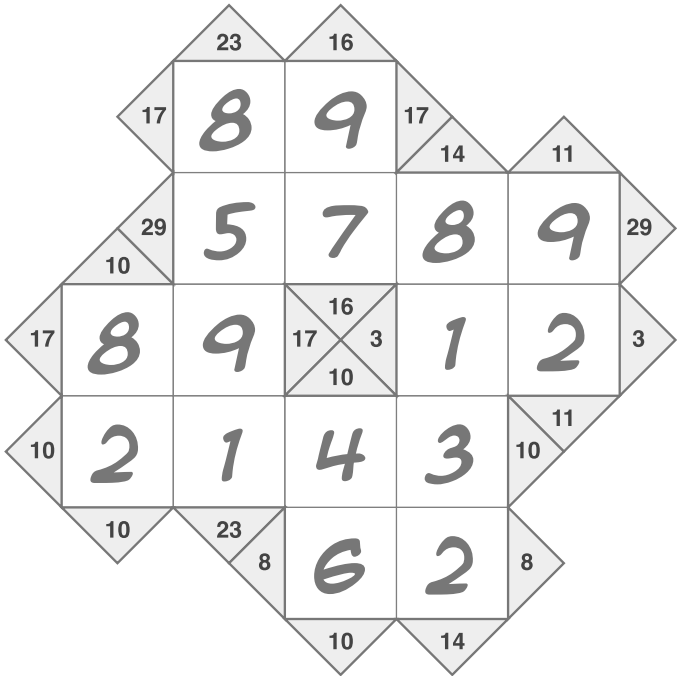
which must be

23 = 8 + 5 + 9 + 1

Which means the clue (DJ = ? + ?) is (17 = 8 + 9) so J must be 7. and the clue (DF = C + ? + G + ?) must be (14 = 8 + 1 + 3 + 2).

So F must be 4, and H must be 5. At this point, the puzzle is solved, and the letters can be fully decoded.

	0	1	2	3	4	5	6	7	8	9
A	×	×	×	×	×	×	✓	×	×	×
B	✓	×	×	×	×	×	×	×	×	×
C	×	×	×	×	×	×	×	×	✓	×
D	×	✓	×	×	×	×	×	×	×	×
E	×	×	✓	×	×	×	×	×	×	×
F	×	×	×	×	✓	×	×	×	×	×
G	×	×	×	✓	×	×	×	×	×	×
H	×	×	×	×	×	✓	×	×	×	×
I	×	×	×	×	×	×	×	×	×	✓
J	×	×	×	×	×	×	×	✓	×	×



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