

SUM BLOBS

STRATEGIES

1. Start with the biggest numbers.

Sometimes, the biggest number is close to the target sum. So, there are limited ways to reach the sum.

What blob is 9 part of?

Sum: 10		
7	1	2
3	9	2
6	4	6

The only way to make a blob with sum 10 that includes the 9 is with the 1.

Sum: 10		
7	1	2
3	9	2
6	4	6

2. Check the corners.

Numbers in the corners have limited options. As we create blobs, we create more “corners”.

What blob is 17 part of? What blob is 19 part of?

Sum: 40		
16	23	17
14	10	22
19	21	18

The 17 only touches 23 and 22. We can't complete a blob that has $17+22=39$. But, since $17+23=40$, we draw a blob around 17 and 23.

Similarly, the 19 only touches 14 and 21. We can't complete a blob that includes $19+14=33$. So, we draw a blob around 19 and 21.

Sum: 40		
16	23	17
14	10	22
19	21	18

3. Don't isolate small regions.

When drawing blobs, don't separate numbers or groups of numbers that can't form blobs.

What blob includes the 12 in the bottom-left corner?

Sum: 50		
26	23	14
24	12	13
12	13	13

The only way to get a sum of 50 using the 12 in the bottom-left corner is $12+13+12+13$.

There are two ways to draw a blob that includes two 12's and two 13's.

Sum: 50		
26	23	14
24	12	13
12	13	13

Sum: 50		
26	23	14
24	12	13
12	13	13

However, the blob on the left leaves a 13 in the bottom-right corner that can't be used. So, we use the blob on the right.

4. Look for unusual numbers.

Sometimes, one or a few numbers look different from all the others.

Which numbers are different?
What blobs are they in?

Sum: 374			
98	276	98	276
276	98	276	98
98	176	198	276

The grid is all 98's and 276's, except for one 198 and one 176 in the bottom row.

The only way to get a sum of 374 with 198 is $198 + 176$. So, we circle that blob.

Sum: 374			
98	276	98	276
276	98	276	98
98	176	198	276

5. Draw walls.

If two touching squares can't be part of the same blob, draw a wall between them.

What squares in the following puzzle can't be part of the same blob?

Sum: 404		
105	99	99
299	206	305
206	198	99

We look for numbers that touch and have a sum greater than 404.

$206 + 305$ is more than 404, so they cannot be in the same blob. We draw a wall between 206 and 305.

Sum: 404		
105	99	99
299	206	305
206	198	99

$299 + 206$ is more than 404, so we draw walls between 299 and both 206's.

Sum: 404		
105	99	99
299	206	305
206	198	99

So, the 299 must be in a blob with the 105 above it.

Sum: 404		
105	99	99
299	206	305
206	198	99

6. How can we get the target sum with the given numbers?

Sometimes there are only a few ways to get the target sum using the numbers in the grid.

How can we get a sum of 111?

Sum: 111			
1	1	10	10
10	100	100	1
10	100	1	100

Using the numbers in the grid, only $1 + 10 + 100$ equals 111. So, each blob has exactly one 1, one 10, and one 100.

Then, we can use strategy #5 to separate identical numbers.

Sum: 111			
1	1	10	10
10	100	100	1
10	100	1	100

7. Look at the ones digits.

Which numbers have unusual ones digits? What blobs are they part of?

Sum: 90			
10	20	21	10
20	20	40	40
20	19	40	40
10	20	20	10

Only 19 and 21 have a ones digit that is not 0.

Sum: 90			
10	20	21	10
20	20	40	40
20	19	40	40
10	20	20	10

We can only get a sum with ones digit 0 if 19 and 21 are in the same blob. This blob must also include squares that add up to 50. There are two ways to do this.

Sum: 90			
10	20	21	10
20	20	40	40
20	19	40	40
10	20	20	10

Sum: 90			
10	20	21	10
20	20	40	40
20	19	40	40
10	20	20	10

If we use the blob on the left, we can't make a blob that uses the 10 in the top-left corner. So, we use the blob on the right.

8. Odds and evens.

The sum of an odd number of odds is odd. The sum of an even number of odds is even.

Which two numbers must be part of the same blob?

Sum: 18			
6	8	4	4
6	4	2	1
1	2	2	6
8	8	4	6

The target sum, 18, is even. Only two odd numbers are in the grid (1 and 1), so they must be part of the same blob.

Since the 1's are part of the same blob, this blob separates the grid into a top part and a bottom part. We use strategy #3 (don't isolate small regions) to find the other numbers in this blob.

Sum: 18			
6	8	4	4
6	4	2	1
1	2	2	6
8	8	4	6

9. How many squares are in each blob?

Sometimes we can figure out how many numbers are in each blob. This will help us fit those blobs on the grid.

How many squares are in each of the four blobs?

Sum: 14			
1	1	1	1
9	10	1	1
1	12	13	1
1	1	1	1

There are twelve 1's, one 9, one 10, one 12, and one 13.

We can't get a sum of 14 using just the 1's. So, our four blobs are

13+1, for a blob of two squares,
 12+1+1, for a blob of three squares,
 10+1+1+1+1, for a blob of five squares,
 and 9+1+1+1+1+1, for a blob of six squares.

10. Which numbers are linked?

Sometimes there are pairs of numbers that must be in the same blob.

In the puzzle below, we can only get a sum of 13 with 1+2+10 or 3+10. So, each blob with a 2 must also have a 1.

How can we pair each 1 with the 2 that must be in the same blob?

Sum: 13			
3	10	1	2
10	1	10	2
3	10	1	10
2	1	10	2

The 1 in the bottom-left corner can only be paired with the 2 next to it. The 2 in the top-right corner can only be paired with the 1 to its left. We draw lines to connect them.

Sum: 13			
3	10	1	2
10	1	10	2
3	10	1	10
2	1	10	2

Then, the 2 in the bottom-right corner can only be in the same blob as the 1 in the third row. Finally, the remaining 2 and 1 in the second row must be part of the same blob with the 10, so we circle it.

Sum: 13			
3	10	1	2
10	1	10	2
3	10	1	10
2	1	10	2

11. How can we group the numbers to get the target sum?

How many 3's can be in a blob?

Sum: 36			
9	3	9	3
9	27	9	9
9	9	3	9
27	9	27	9

The grid has three 3's, ten 9's, and three 27's.

If only one or two 3's are in a blob, we can't make a sum of 36. So, all three 3's must be in the same blob. We can't draw a blob with three 3's and one 27, so the three 3's are in a blob with three 9's.

This leaves seven 9's and three 27's.

Each 27 must be paired with one 9. This leaves four 9's for the final blob.

So, the blobs are (3+3+3+9+9+9), (9+9+9+9), (9+27), (9+27), and (9+27).

(Where can we draw the blob with four 9's?)