

FACTOR CAVE

STRATEGIES

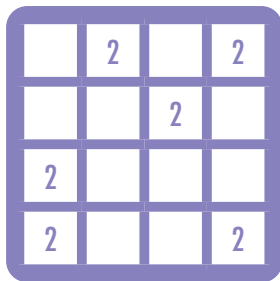
1. Circle squares that must be unshaded.

This makes it easier to keep track of our progress on a puzzle.

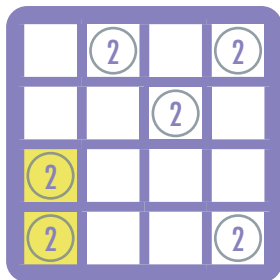
Don't forget that all clue numbers must be unshaded, so we can always circle them.

2. Look for clues that are "done".

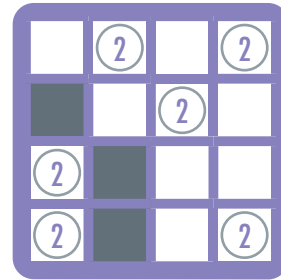
In the puzzle below, which clues already equal the product of the number of squares they can see in their row and column?



The 2's highlighted below can already see 2 squares in their column and 1 square in their row. Since $2 \times 1 = 2$, these clues are "done".



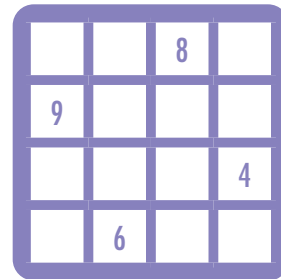
These clues cannot see any more squares, or else their product would be greater than 2. So, the squares surrounding them must be shaded.



3. Look at numbers with few possible factor pairs.

Some clue numbers only have one possible factor pair.

How many squares can the 9 see in its row and column in the puzzle below?

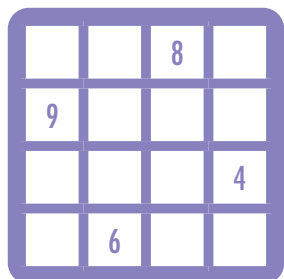


9 can be written as the product of two numbers in three ways: 9×1 , 3×3 , and 1×9 . However, the grid is only 4 squares tall and wide, so it is impossible to see 9 squares in a row or column.

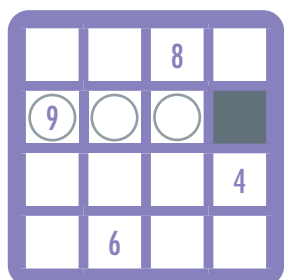
Therefore, the 9 must see 3 squares in its row and 3 squares in its column.

4. Look at numbers on the edges or corners.

From strategy 3, we know that the 9 in the puzzle below sees 3 squares in its row. Which squares in the row must be shaded and unshaded?

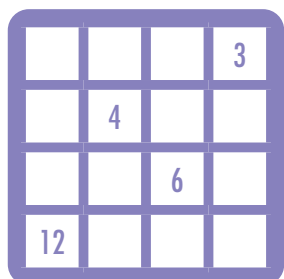


Because the 9 is on the left edge, it can only see squares to its right. In order to see 3 squares in its row, the 2 squares to the right of the 9 must be unshaded, and the last square must be shaded.



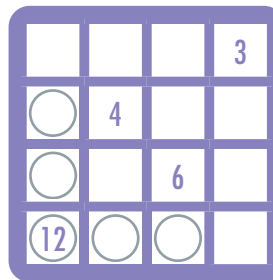
5. Find squares that must be unshaded, even if there isn't a unique way to factor a number.

Which squares in the same row and column as the 12 must be unshaded?



12 sees either 3 squares in its row and 4 squares in its column, or 4 squares in its row and 3 squares in its column.

Either way, the 12 will always see *at least* 3 squares in its row and column, so all of the squares below must be unshaded.

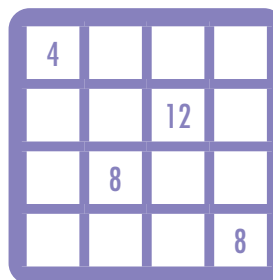


This strategy works best with numbers on the edges or corners, but we can also use it with numbers that are close to the edge.

6. Look at large numbers.

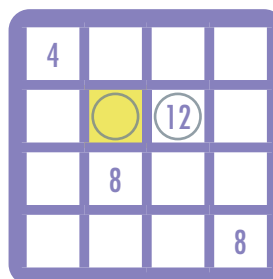
Larger numbers are generally more helpful because they require more unshaded squares.

In the puzzle below, which squares must be unshaded for the 12 clue?

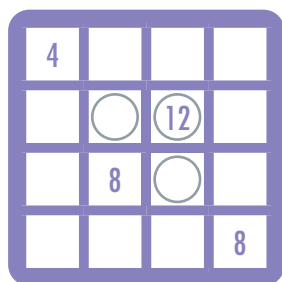


The valid factor pairs for the 12 are 3×4 and 4×3 . So, the 12 must see at least 3 squares in its row. If we shade the highlighted square below, then the 12 sees at most 2 squares in its row.

So, the square to the left of the 12 must be unshaded.



We can use the same logic with the 12's column to see that the square below the 12 must also be unshaded.



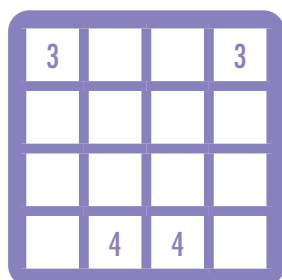
7. Check which possible factor pairs and orientations fit.

If a number has several possible factor pairs, try pairs and eliminate the ones that don't work.

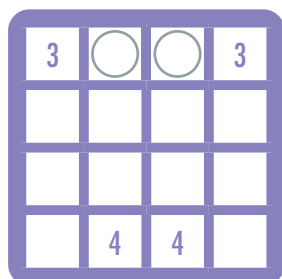
It is often helpful to start with numbers in the corners (strategy 4).

In this puzzle below, there are two options. Either the 3 in the top-left corner sees 3 squares in its row and 1 square in its column, or it sees 1 square in its row and 3 squares in its column.

Which option works?

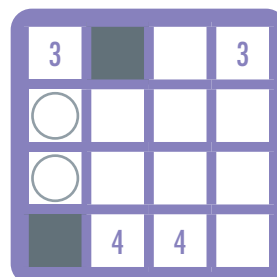


If the 3 clue sees 3 squares in its row, then the 2 squares to the right of the clue must be unshaded:



However, the top-right corner must also be unshaded because it has a clue, so the 3 clue now sees four squares in its row. This is not possible!

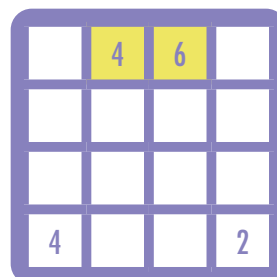
So, the 3 clue sees 1 square in its row and 3 squares in its column.



This strategy can also be useful for numbers on the edges (Strategy 4) or for numbers close to other numbers (Strategy 8).

8. If two clues can see each other, then they must share a common factor.

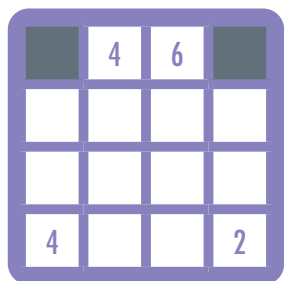
How many squares can the highlighted clues see in their row?



Because the 4 and 6 see each other horizontally, they must see the exact same number of squares in their row. This number must be a factor of both 4 and 6, so it is either 1 or 2.

Since these clues already see two squares in their row, the 4 and 6 must see exactly 2 squares in their row.

That means the squares below must be shaded.



Also notice that if two clues do not share any common factors, then they cannot see each other.

This strategy can be helpful whenever there are two clues close to each other.