

Number Pyramids

A GUIDE

Stack numbers like bricks — add your way up, subtract your way down, and no gap can hide from you.

Bricks That Add Themselves

Imagine a wall built from number bricks. Every brick sits on two bricks below it, and it holds one secret: it is the sum of those two. That is the whole game — one rule, repeated.

Look at the pyramid below. The 5 sits on 2 and 3, because $2 + 3 = 5$. The 7 sits on 3 and 4. And the very top? $5 + 7 = 12$. Once you see it, you can't unsee it.



The One Rule: Add Upward

To fill a pyramid from the bottom, you work row by row, like laying real bricks. Take each pair of neighbors, add them, and write the answer on the brick above. When a row is done, move up and do it again.

Notice something sneaky: the middle number of the bottom row gets used twice — once for the brick on its left, once for the brick on its right. That is why the middle brick has extra power over the top.

Worked example The bottom row of a pyramid is 3, 5, 2. What number lands on the top brick?

1. Add the left pair: $3 + 5 = 8$, so 8 goes above them.
2. Add the right pair: $5 + 2 = 7$, so 7 goes next to the 8.
3. Add the new pair: $8 + 7 = 15$, and that fills the top.

Answer: 15

When a Brick Goes Missing

Here is where you become a detective. If a lower brick is blank but the brick above it is filled, you can't add — so you subtract instead. The two bricks under any brick must add up to it, so the missing one is just brick above – the brick you know.

Cover the 7 in the pyramid below with your finger. You still know the 11 above it and the 4 beside it. So the hidden brick has to be $11 - 4 = 7$. Subtraction is just addition running downhill.



Worked example A brick holds 11. One of the two bricks right under it holds 4. What is in the other one?

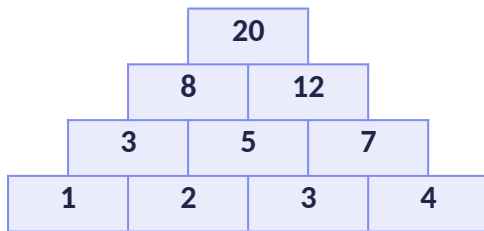
1. The two bricks under 11 must add up to 11.
2. One of them is 4, so the missing one is $11 - 4$.
3. $11 - 4 = 7$, so the blank brick holds 7.

Answer: 7

Go Taller

Ready for a bigger wall? A pyramid with four bottom bricks works exactly the same way — there are just more pairs to add. Four bricks make three, three make two, and two make the top.

Trace the pyramid below yourself: $1 + 2 = 3$, then $2 + 3 = 5$, then $3 + 4 = 7$. Keep going up and the top comes out to 20. Tall pyramids aren't harder, they're just longer — and mixing adding-up with subtracting-down lets you crack a pyramid with gaps anywhere.



Worked example The bottom row of a pyramid is 1, 2, 3, 4. What is the top brick?

1. Add the bottom pairs: $1 + 2 = 3$, then $2 + 3 = 5$, then $3 + 4 = 7$.
2. Add the new pairs: $3 + 5 = 8$ and $5 + 7 = 12$.
3. Add the last pair: $8 + 12 = 20$.

Answer: 20

Remember

- ★ If both bricks below are known, add up; if the brick above and one below are known, subtract down.
- ★ Middle bottom bricks get counted more than once on the way up, so putting big numbers in the middle makes the top bigger.
- ★ A missing brick is never a mystery — it is always the brick above minus its neighbor.
- ★ When you finish a pyramid, re-check one pair anywhere; if that pair adds correctly, you probably built the whole thing right.

Now you try

- 1) Two bottom bricks hold 4 and 5. What number goes in the brick sitting on top of them?
Answer: _____
- 2) The bottom row of a pyramid is 2, 3, 5. What number ends up on the top brick?
Answer: _____
- 3) A brick holds 12, and the brick below it on the left holds 7. What does the brick below it on the right hold?
Answer: _____
- 4) The top brick of a pyramid is 20, and one of the two middle bricks is 9. What is the other middle brick?
Answer: _____
- 5) A pyramid's bottom row is 6, ?, 4, and the brick sitting on the 6 and the mystery brick holds 10. What is the top brick of the whole pyramid?
Answer: _____
- 6) The bottom row of a four-brick-wide pyramid is 1, 3, 2, 4. What is the top brick?
Answer: _____
- 7) The top brick of a pyramid is 30, and the two middle bricks under it are equal. What number is in each middle brick?
Answer: _____
- 8) A three-row pyramid has bottom row 3, ?, 7 and its top brick is 24. What is the missing bottom number?
Answer: _____

Answers — check yourself

1. 9
2. 13
3. 5
4. 11
5. 18
6. 20
7. 15
8. 7