

Arrow Chains

A GUIDE

Follow the arrows, read the jumps, and always know where your number lands.

A Number Goes on a Trip

Imagine a number going on a trip. It starts somewhere, then hops from stop to stop. Each hop is drawn as an arrow, and the arrow tells you exactly what happened on that hop.

Look at the chain below. It starts at 5. The first arrow says $+3$, so the number hops up to 8. The next arrow says -2 , so it drops down to 6.



Read What the Arrow Says

Sometimes the arrow is blank, and your job is to figure out what it says. You get two clues: the number before the arrow and the number after. That is all you need.

First ask: did the number get bigger or smaller? Bigger means the arrow is a $+$. Smaller means it is a $-$.

Then ask: by how much? Subtract the smaller number from the bigger one. That difference is what goes on the arrow.

Worked example A chain shows $9 \rightarrow 4$. What does the arrow say?

1. Compare the two numbers: 4 is smaller than 9, so the arrow is a minus.
2. Find how much it dropped: $9 - 4 = 5$.
3. Put it together: the arrow says -5 .

Answer: -5

Keep a Running Value

Longer chains are just more hops. The trick is to keep one running value in your head. After every arrow, update it before you even look at the next one.

Say the numbers out loud as you go, like a rocket countdown: ten... six... thirteen... ten. If you ever lose your place, no problem — start again from the first stop.



Worked example Start at 10. Follow -4 , then $+7$, then -3 . Where do you end?

1. First hop: $10 - 4 = 6$.
2. Second hop: $6 + 7 = 13$.
3. Third hop: $13 - 3 = 10$.
4. You ended right back where you started!

Answer: 10

Hunt for Missing Pieces

Now for the detective work. Sometimes a number in the middle of the chain is hidden. You can still find it, because arrows never lie.

If you know the number before the gap, follow its arrow forward. If you only know the number after the gap, walk backwards: undo the arrow by flipping it. Undoing + 5 means going - 5, and undoing - 5 means going + 5.



Worked example A chain goes $18 \rightarrow ? \rightarrow 11$, and the second arrow says - 5. What is the hidden number?

1. The - 5 arrow landed on 11, so undo it by flipping: go backwards with + 5.
2. Walk back: $11 + 5 = 16$, so the hidden number is 16.
3. Check it forwards: $18 \rightarrow 16$ is - 2, and $16 - 5 = 11$. It all fits.

Answer: 16

Remember

- ★ If the next number is bigger, the arrow is a +; if it is smaller, the arrow is a -.
- ★ To find how big a jump is, subtract the smaller number from the bigger one.
- ★ Update your running value after every single arrow — never try to skip ahead.
- ★ To walk a chain backwards, flip every arrow: + becomes - and - becomes +.

Now you try

- 1) Start at 4. The arrow says + 3. Where do you land?

Answer: _____

- 2) A chain goes $10 \rightarrow 6$. What does the arrow say?

Answer: _____

- 3) Start at 8. Follow + 5, then - 2. Where do you end?

Answer: _____

- 4) A chain shows $7 \rightarrow 12 \rightarrow 9$. What are the two arrows, in order?

Answer: _____

- 5) Start at 20. Follow - 6, then - 6, then + 1. Where do you end?

Answer: _____

- 6) A chain goes $15 \rightarrow ? \rightarrow 11$, and the first arrow says - 7. What is the hidden middle number?

Answer: _____

- 7) A chain starts at 6, follows two arrows, and ends at 6. The first arrow says + 9. What does the second arrow say?

Answer: _____

- 8) A chain follows three arrows — + 4, then - 10, then + 4 — and ends at 30. What number did it start at?

Answer: _____

Answers — check yourself

1. 7
2. - 4
3. 11
4. + 5, then - 3
5. 9
6. 8
7. - 9
8. 32