How to Solve It?

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The list

How to Solve It?

The Josephus Problem
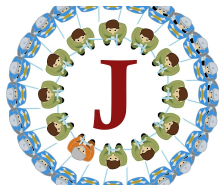
$$J(n) = ?$$

$$J(2n) = 2J(n) - 1, \quad n \geq 1$$

$$J(2n + 1) = 2J(n) + 1, \quad n \geq 1$$

How to Solve It?

Small cases

How to Solve It?

Making a guess

$$J(2^m + l) = 2l + 1, \quad m \geq 0, 0 \leq l < 2^m$$

How to prove it?

How to Solve It?

Looking back

Can you check the result?
– G. Póya

$$J(2^m) = 1$$

How to Solve It?

Looking back

Can you see it at a glance?
– G. Póya

$$J(2^m + l) = 2l + 1$$

Looking back

Can you derive the result differently?
– G. Póya

Looking back

generalize???
– G. Póya

How to Solve It?

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Straightlines

Straightlines
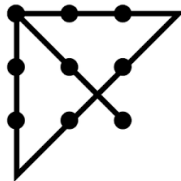
24 Game

$$5 \quad 5 \quad 5 \quad 1$$

24 Game

5   5   5   1

3   3   8   8