

## Correctness

If the reduction returns YES, then  $G$  was 3-colorable.

## Want to prove your problem is hard?

To show  $B$  is hard,

Reduce **FROM** the known hard problem **TO** the problem you care about  
A reduction **From** an NP-hard problem  $A$  to  $B$ , shows  $B$  is also NP-hard.

# Hamilton

On a directed graph  $G$ :

A Hamiltonian Path is a path that visits every vertex exactly once.

A Hamiltonian Cycle is a Hamiltonian Path with an extra edge connecting the first vertex to the last vertex.

Assume that Hamiltonian Path is NP-hard (it is)

Use that to prove Hamiltonian Cycle is NP-hard.

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## What (we think) the world looks like

Assuming  $P \neq NP$

