1: $J \cdot H = id, \; H \cdot F = H \cdot G$ assumptions

. . .

2: $J \cdot (H \cdot G) = G$

3: $J \cdot (H \cdot F) = G$ Fold with hypothesis 1.2,2

4: $J \cdot H \cdot F = G$ Associativity 3

5: $id \cdot F = G$ Unfold with hypothesis 1.1,4

6: $F = G$ Fold using Conjecture $F = id \cdot F$ 5