

$p$

$x \mapsto [-\text{inf}, -2]$   
 $i \mapsto [0, 0]$

$q$

$x \mapsto [-1, 1]$   
 $i \mapsto [1, 1]$

$r$

$x \mapsto [2, \text{inf}]$   
 $i \mapsto [2, 2]$

$p \sqcup q \sqcup r$

$x \mapsto \top$   
 $i \mapsto [0, 2]$