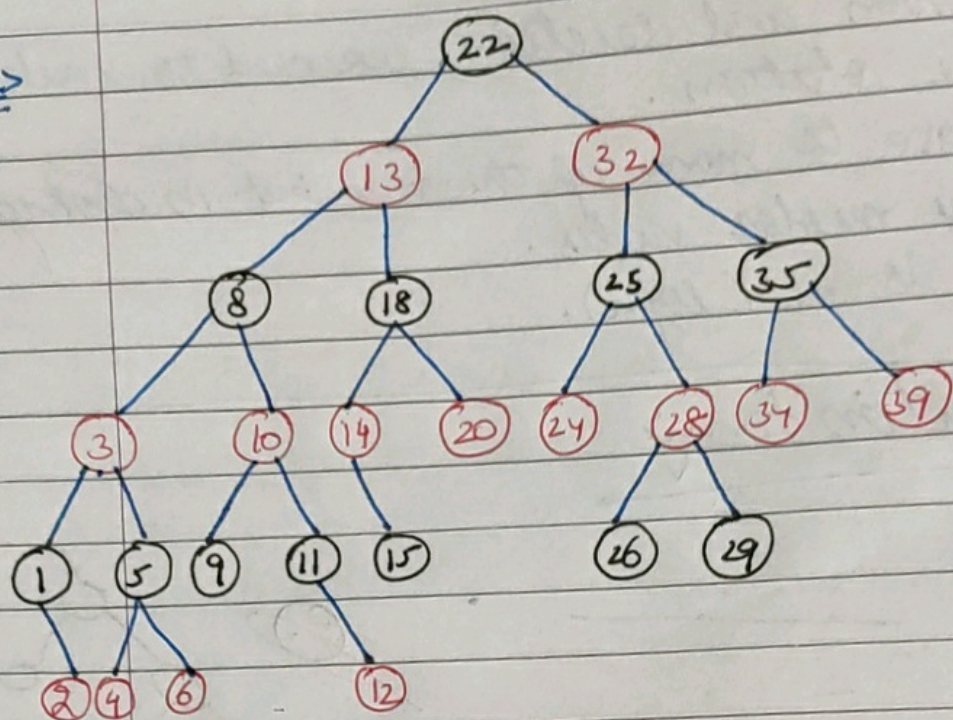


Homework 12.1

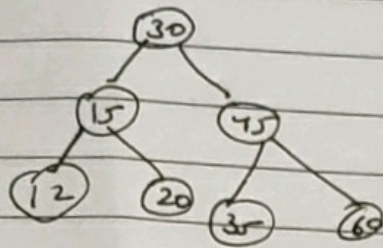
Ans 2 →





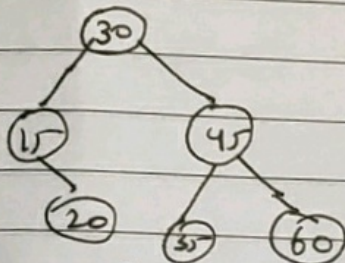
## Homework 12.2

Ans → (a)



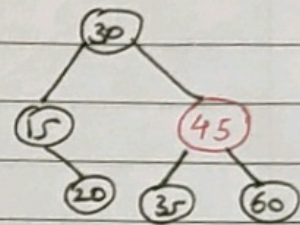
- After removing 12 from the tree, the black height of subtree rooted at 15 would ~~not~~ change creating a height imbalance.

- This corresponds to deletion case 2.2.2 from Navin Sir's lectures where parent of subtree is black and other child is black. ~~After~~ further, child has no red child.

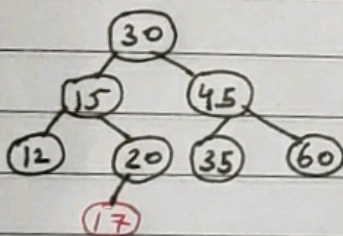


After removing

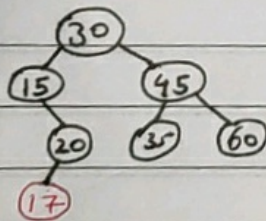
recoloring →



final tree.

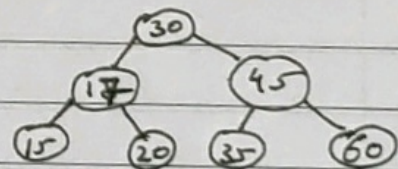


- Here also imbalance occurs.
- This corresponds to case 2.2.1 where parent is black, sibling is black and sibling has a right child.



After removing

recoloring and rotation →



Final tree