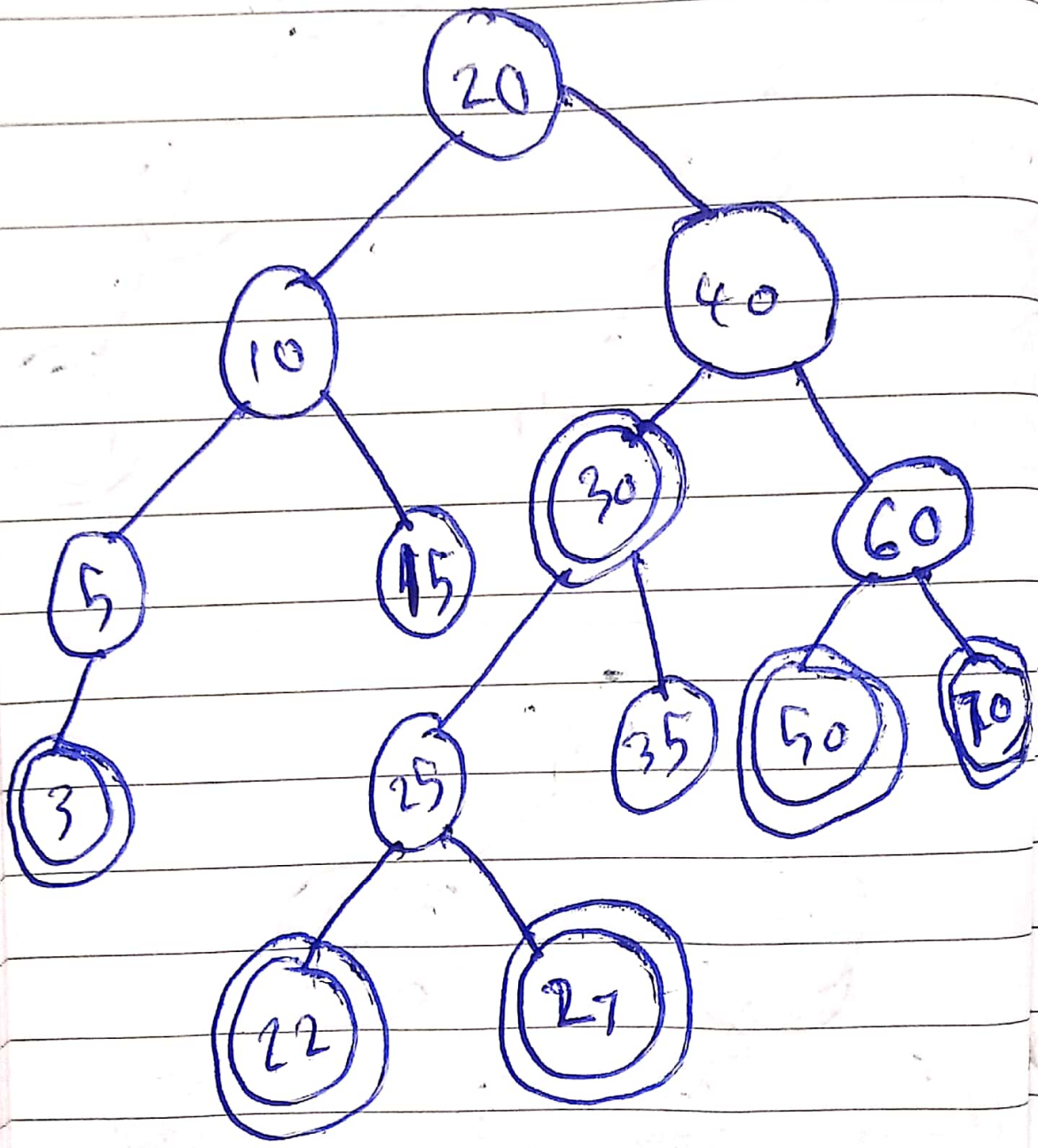
Black nodes

Red nodes



Is this a red-black tree? If so, why?

Ans:- This is a valid red-black tree because:-

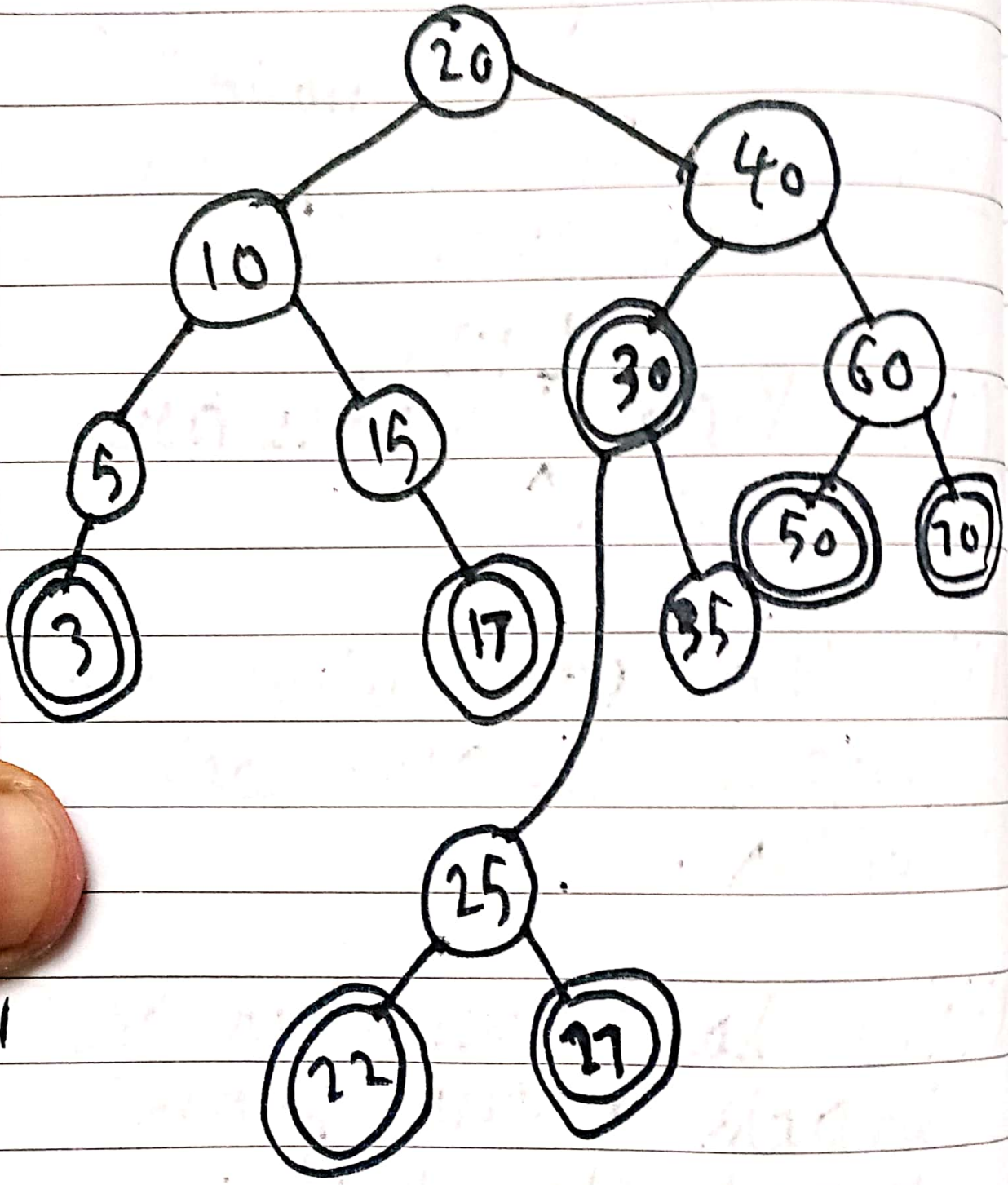
(i) Root & NIL nodes are black.

(ii) No consecutive red nodes below each other.

(iii) Same number of black nodes from root to leaf in every branch. i.e. 3.

(iv) All nodes are either red or black.

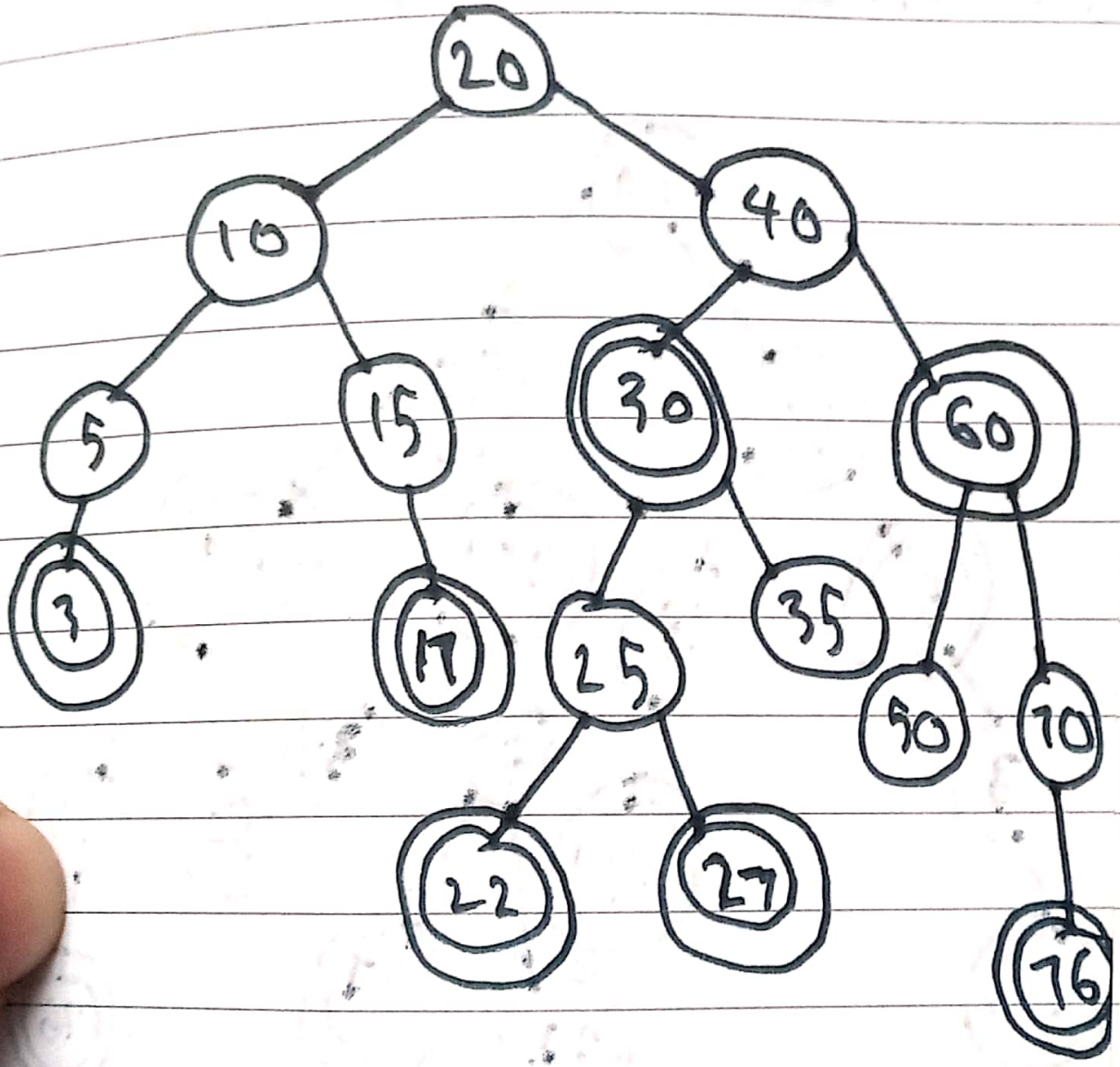
(a) Insert 17 to tree :-



Reason :- Inserted as per BST insertion as a red node because new leaves

inserted are always red.

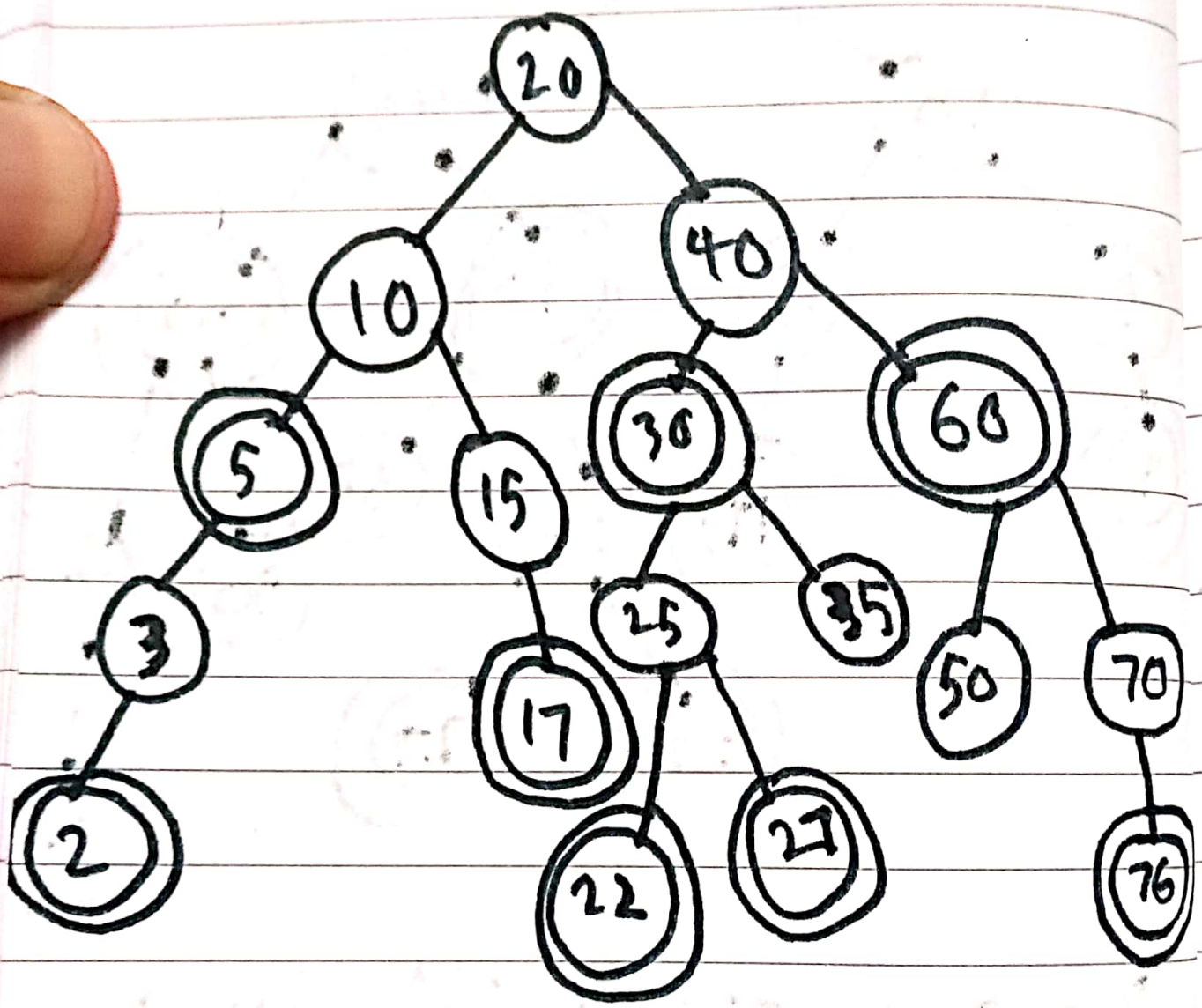
(b) Insert 76 to tree



Reason:- 76 will be a red node because his uncle was red, so we changed the parent and uncle to black and

changed the grandfathers to red.

(1) Insert 2 to tree



Reason: 2's parent and uncle were red, so we changed the parent to

black and grandparent to red because 2 have to be red, since it's a new leaf node.