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CERTAIN RESULTS ON NON- ASSOCIATIVE RINGs

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ABSTRACT: In this paper mainly we have obtained certain theorems on non-associative rings to be commutative under multiplication.

KEYWORDS: non-associative ring, 2-divisiable associative ring

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INTRODUCTION: M.Ashraf, M.A. Quadri and D-Zelinsky[ ] generalized some results for non associative rings. In that paper they obtained that for a non associative ring in which $(xy)^2$-yx^2y is centre then R is commutative. In this paper we proved that for a non associative ring R with unity 1 such that $(xy)^2=(yx^2)y$ then R is commutative. It is also observed that for a non associative ring R with unity 1satisfying $x^2y=yx^2$ then R is commutative. It is also observed in this paper that for 2-Divisiable associative ring R with unity 1 such that $(x,x^2+y^2)=0$ then R is commutative.

Definition 1: Anon empty set R together with the binary operations +,.satisfying

1) (R,+) is a commutative group
2) R satisfies Distributive laws then (R,+,.)is called a non associative ring.

Definition 2: A non associative ring R-is said to be 2-Divisiable ring if $x(x^2y^2+xy)=(x^2y^2+xy)x$.

From the following theorem it is observed that for a non associative ring with unity satisfying the condition $(xy)^2=(yx^2)$ is commutative

Theorem1: If R is a non associative ring R with unity 1 satisfy the condition which $(xy)^2$-yx^2y then R is commutative.

Proof: Let R be a non associative ring R with unity 1 satisfy the condition which $(xy)^2$-yx^2y then by replacing x by x+1 hen we have

$[\ (x+1)y]^2=[\ y\ (x+1)]^2y \Rightarrow [\ (xy+y)]^2=[y(x+1)\ (x+1)]y$

$\Rightarrow (xy+y)]\ (xy+y)]=[y(xx+x+x+1)]y$

$=(yxx+yx+yx+y)y$

$=yxxy+yxy+yxy+yy$

$\Rightarrow\ xyxy+xyy+yxy+yy\quad = yx2y+yxy+yxy+yy$

Similarly by replacing y by y+1 then we have

$[\ x(y+1)]^2=[\ (y+1)\ x^2]\ y+1$

$\Rightarrow[\ (xy+x)]^2=(\ yx^2+x^2)(y+1)$

$\Rightarrow (xy+x)\ (xy+x) = yx^2y+yx^2+x^2y+x^2$

$\Rightarrow xyxy+xyx+x\ xy+ x^2= yx^2y+yx^2+x^2y+x^2$

Imply that R is commutative.

Theorem2: If R is a non associative ring R with unity 1 satisfy the condition which $x^2y=yx^2$ then R is commutative.

Proof: Let R be a non associative ring R with unity 1 satisfy the condition $x^2y=yx^2$

Replacing x by x+1 then $(x+1)^2y=y(x+1)^2$

$\Rightarrow [(x+1)\ (x+1)]y=y[(x+1)\ (x+1)]$

$\Rightarrow(x^2+x+x+1)y=y(x^2+x+x+1)$

$\Rightarrow x^2y+xy+xy+y= yx^2+yx+yx+y$

Similarly by replacing y by y+1 then

$x^2(y+1)= (y+1)\ x^2$

$\Rightarrow x^2y+ x^2= yx^2+ x^2$

Imply that R is commutative.

Theorem3: If R is a 2-divisable non associative ring R with unity 1 such that $(x, x^2y^2+xy)=0$ then R is commutative.

Proof: If R is a 2-divisable non associative ring R with unity 1 satisfy the condition $(x, x^2y^2+xy)=0$

Imply that $x(x^2y^2+xy)= (x^2y^2+xy)x$

Replacing x by x+1 then

$(x+1)[(x+1)^2y^2+(x+1)y]=[\ (x+1)^2y^2+(x+1)y])x$

Simplifying

Similarly Replacing y by y+1 then $x[x^2(y+1)^2+x(y+1)]= [x^2(y+1)^2+x(y+1)x]$

Simplifying then it is easily observed that R is commutative.

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