⑧ $\bar{4} +_6 \bar{5} \overset{?}{=} \bar{5} +_6 \bar{4}$

$\bar{3} = \bar{3}$

$\therefore$ $a * b = b * a \quad \forall\, a, b \in G$

i.e $\bar{a} +_6 \bar{b} = \bar{b} +_6 \bar{a} \quad \forall\, a, b \in Z_6$

$\therefore$ $(Z_6, +_6)$ is comm. gp.

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Q/ show whether the math. sys. $(Z\sqrt{3}, +)$ is gp. or not ?

sol.:

① Let $a+b\sqrt{3}$, $c+d\sqrt{3} \in Z\sqrt{3}$

$(a+b\sqrt{3}) + (c+d\sqrt{3}) = (a+c)+(b+d)\sqrt{3} \in Z\sqrt{3}$

$\therefore$ closure is satisfy

② Let $\left.\begin{array}{l} a_1+b_1\sqrt{3} \\ a_2+b_2\sqrt{3} \\ a_3+b_3\sqrt{3} \end{array}\right\} \in Z\sqrt{3}$

$[(a_1+b_1\sqrt{3}) + (a_2+b_2\sqrt{3})] + (a_3+b_3\sqrt{3}) \overset{?}{=} (a_1+b_1\sqrt{3}) + [(a_2+b_2\sqrt{3}) + (a_3+b_3\sqrt{3})]$

L.H.

$[(a_1+a_2)+(b_1+b_2)\sqrt{3}] + (a_3+b_3\sqrt{3}) =$

$(a_1+a_2+a_3) + (b_1+b_2+b_3)\sqrt{3}$ --- ①

R.H.

$(a_1+b_1\sqrt{3}) + ((a_2+a_3)+(b_2+b_3)\sqrt{3}) =$

$(a_1+a_2+a_3) + (b_1+b_2+b_3)\sqrt{3}$ --- ②

$\therefore$ ① = ②