

Math 320
Fall 04

Is it a Group?

Note that addition and multiplication are associative (including in various mods), and that function composition is always associative (why?).

Set	Operation	Closed?	Associative?	Identity?	Inverses?	Is it a Group?
Natural Numbers $\mathbb{N} = \{1, 2, 3, \dots\}$	+					
\mathbb{N}	-					
\mathbb{N}	x					
\mathbb{N}	÷					
Integers $\mathbb{Z} = \{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$	+					
\mathbb{Z}	-					
\mathbb{Z}	x					
Rationals $\mathbb{Q} = \left\{ \frac{a}{b} \mid a, b \in \mathbb{Z}, b \neq 0 \right\}$	+					
\mathbb{Q}	-					
\mathbb{Q}	x					
\mathbb{Q}	÷					
Integers mod 3, \mathbb{Z}_3	+					
\mathbb{Z}_4	+					
\mathbb{Z}_5	+					
\mathbb{Z}_6	+					
\mathbb{Z}_3	x					
\mathbb{Z}_4	x					
\mathbb{Z}_5	x					
\mathbb{Z}_6	x					
U_{10} = units, mod 10, $\{1, 3, 7, 9\}$ (rel. prime to 10)	+					
U_{10}	x					
U_3	x					
U_5	x					
U_6	x					
D_3 = symmetries triangle	composition					
C_3 = rotations of triangle	composition					

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