

I found this group table lying on my desk (I checked that it was associative by testing all 216 cases, you can quickly check the other properties yourself!). Could this group be  $D_6$ ?

*	A	B	C	D	E	G
A	B	A	D	C	G	E
B	A	B	C	D	E	G
C	G	C	B	E	D	A
D	E	D	A	G	C	B
E	D	E	G	A	B	C
G	C	G	E	B	A	D

1. Why doesn't the correspondence  $A \leftrightarrow F, B \leftrightarrow I, C \leftrightarrow FR^2, D \leftrightarrow R, E \leftrightarrow FR, G \leftrightarrow R^2$  work for showing this group is  $D_6$ ?
2. Suppose that I wanted to match up the elements by saying that  $C \leftrightarrow F$  and  $G \leftrightarrow R$ . What would the other four correspondences have to be?
3. We use the term *isomorphic* to express the idea that two groups are essentially the same (equivalent but not necessarily equal). So the group given by the mystery table is isomorphic to  $D_6$ .
4. Write a definition for isomorphic.

Definition: Let  $(G, \bullet)$  and  $(H, *)$  be groups.  $G$  is *isomorphic* to  $H$  if...