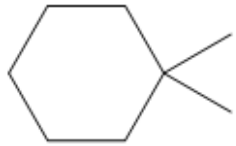
CONCEPT: TEST 3: DISUBSTITUTED CYCLOALKANES

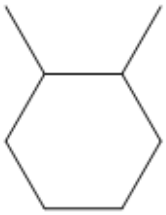
Some of the most commonly tested molecules fall in this category. Although *TEST 1* and/or *TEST 2* could be used to determine chirality, it will be much *faster* for us to just memorize simple rules for them.

□ TEST 3 only applies when a ring has *two identical* substituents



gem-disubstituted

- Always achiral



middle-disubstituted

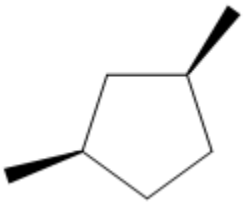
- Cis = Meso, Achiral
- Trans = Chiral
- ***Except:*** 1,2-cyclohexane = Chiral

para-disubstituted

- Always achiral
- Only possible on even-#'d rings

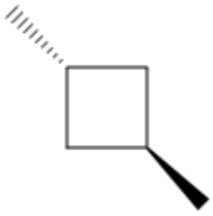
EXAMPLE: Using TEST 3, which of the following molecules is chiral?

a.



c.

b.



d.