

# 1.3

Friday, February 3, 2017 5:54 PM

We know that inductive reasoning can lead to a conjecture, which may or may not be true. One way a conjecture may be proven false is by a **counterexample**.

**Example 1:** If possible, find a counterexample for each conjecture. If not, write "true".

- a. Conjecture: Every mammal has fur.

Counterexample: whales

- b. Conjecture: The acute angles in a right triangle are equal.

Counterexample:



Counterexample

- c. Conjecture: A polygon has more sides than diagonals



3 sides  
0 diagonals



4 sides  
2 diagonals



5 sides  
5 diagonals

- d. Conjecture: The square of every even number is even.

$0^2=0$     $2^2=4$     $4^2=16$    True.

- e. Conjecture: An even number is any number which is not odd.

Counterexample  $\frac{1}{2}$  (or 0.5) not odd, but not even either

**Example 2:** Three conjectures are given.

For which conjectures is this diagram a counterexample?

- A. The opposite sides of a parallelogram are equal.

Not a counter example



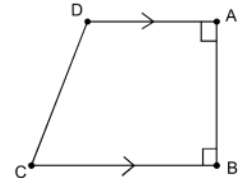
- B. A quadrilateral cannot have both a 90° angle and an obtuse angle.

Counter example  
The diagram is a quadrilateral with 90° angle + an obtuse angle.

- C. Every trapezoid has 2 pairs of equal angles.

Counter example

The diagram has only one pair of equal angles.



Assignment: pg. 22 #1, 3-6, 10, 12, 14, 17

optional