Counter Examples

Example 1

$$A \cup (B \cap C) = (A \cap B) \cup (A \cap C)$$

A simple counter-example:

$A = \{a\}$
$B = \{b\}$
$C = \{c\}$

Where a, b and c are different.

Example 2

$$A \cup (B \cap C) = (A \cap B) \cup C$$

A Counter Example:

$A = \{a\}$
$B = \emptyset$
$C = \{c\}$

with a different from c