Additional Problem Assignment 2

1. For each of the following state that the following is true or give a counter-example. You don't need to prove the truth of any of the statements.

   (a) $\otimes$ defined by $a \otimes b = a^b$ is a binary operator on $\mathbb{N}$, the natural numbers.

   (b) $\otimes$ defined by $a \otimes b = a^b$ is a binary operator on $\mathbb{Q}^+$, the positive rational numbers.

   (c) $\otimes$ defined by $a \otimes b = 7$ is an associative binary operator on $\mathbb{R}$, the real numbers.

   (d) $\otimes$ defined by $a \otimes b = a + b + 1$ is a communative binary operator on the odd natural numbers.

   (e) $\otimes$ defined by $a \otimes b = a$ is an associative binary operator on $\mathbb{R}$.