

Answer on Question#54667 – Math – Linear Algebra

Question. Which of the following statements are true and which are false? Justify your answer with a short proof or a counterexample.

2) The operation $*$ defined by $x * y = \log(xy)$ is a binary operation on S where

$$S = \{x \in \mathbb{R} \mid x > 0\}.$$

Solution. Let $x = 1 > 0, y = \frac{1}{e} = e^{-1} > 0$. Then $\log(xy) = \log(e^{-1}) = -1 < 0 \Rightarrow$

$\Rightarrow \exists x, y \in S: \log(xy) \notin S \Rightarrow$ the operation $*$ is not defined on $S \Rightarrow$ the operation $*$ is not a binary operation on S .

Answer. False.