

For each of the following equations, say whether or not the equation is always true and say very briefly why or why not. In other words, determine if the right hand side is an equivalent way to write the left hand side of the equation. If the equation is not always true, then find an equivalent way to write the left hand side. In other words, find another equation that has the same left hand side and is always true. Explain very briefly. (Use applicable properties of arithmetic!) You may assume that N stands for a positive integer.

1. $(1 + a)b + (1 + a)b = (1 + a)^2b$

2. $(1 + a)b + a(1 + a)b = (1 + a)^2b$

3. $b \cdot 1 + b \cdot (1 + a)^N = b \cdot (1 + a)^{N+1}$

4. $(1 + a)(1 + a)^N = (1 + a)^{N+1}$

5. $(1 + a)^N + a(1 + a)^N = (1 + a)^{N+1}$