

Are these proper definitions?

The critical words suggesting choice (or misleadingly avoiding choice) are in bold face.

Example 1. Modular arithmetic:

$$[a] + [b] := [a + b] \quad \text{and} \quad [a] \cdot [b] := [a \cdot b]$$

*That is, **pick** an integer from each of the two equivalence classes, add them up (multiply them), and see which equivalence class the sum (product) belongs to.*

Example 2. Parity (signature) of a permutation: *A permutation σ is even (odd) if the number of transpositions is even (odd) **when σ is written** as a product of transpositions.*

Example 3. A planar graph is a graph that can be depicted in the plane without edges intersecting. *The number of connected regions in **the** depiction is called the number of faces of the graph.*

Euler's Formula (the Descartes-Euler-Legendre Formula): If G is a connected planar graph with v vertices, e edges, and f faces, then $v - e + f = 2$.

An example to think about: Find the number of faces for K_4 (the complete graph on four vertices) when depicted on the surface of the torus (math name for a doughnut).