

1. Let R be a set of actions, where $a \times b$ means “first do b , then do a ” and “ $a + b$ means “choose between doing a and b . In the literature, this is called either a “process algebra” or an “action algebra.”
 - (a) Give an example to show that distributivity fails.
 - (b) What is the multiplicative identity element?
 - (c) Is there an additive identity element? If so, what is it? If not, why not.
2. Show that the set of real-valued $n \times n$ matrices with their usual operations is a ring.
3. Solve the following problems from pages 174–177 in the textbook: 12, 20, 22, 34, 41, 44, 46