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These solutions are not the only "perfect" or "10/10" solutions to be followed as a model. They are examples of ways to solve these problems. There are many many alternative ways to solve these problems. We hope that these example solutions help you check your work.

## Problems

Q1. (a) Double addition of real numbers is given by the formula:

$$a \boxplus b = 2a + 2b$$

where $+$ is the usual addition of real numbers.
Is $\boxplus$ associative?

**Solution:** No! Note that

$$(a \boxplus b) \boxplus c = (2a + 2b) \boxplus c = 2(2a + 2b) + 2c = 4a + 4b + 2c.$$

Nevertheless,