Math 255 Quiz 12 February 28 2018

Name:

Problem 1: *Let a, b, c and m be integers, with $m > 0$.*
Show that if $a \equiv b \pmod{m}$ and $b \equiv c \pmod{m}$, then $a \equiv c \pmod{m}$.

Solution: By Theorem 1 of Section 4 in the book, because $a \equiv b \pmod{m}$ and $b \equiv c \pmod{m}$, this means that there are integers k_1 and k_2 such that $a = b + k_1 m$ and $b = c + k_2 m$.
Substituting, we get

$$a = (c + k_2 m) + k_1 m = c + (k_1 + k_2)m,$$

where here we used associativity and distributivity.
Since $k_1 + k_2$ is also an integer, Theorem 1 allows us to conclude that $a \equiv c \pmod{m}$.