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Mathematics 309a: Abstract Algebra
Winter Semester 2009
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Quiz #15
April 2

Following the notation of the text and the last class, we saw that the definition for adding equivalence classes of pairs in $S = \{(a, b) \mid a, b \in D, b \neq 0\}$ (where D is an integral domain) was given by:

(1) $[(a, b)] \oplus [(c, d)] = [(ad + bc, bd)]$ where

(2) $[(x, y)]$ denotes the equivalence class of (x, y)

and (3) (a, b) is equivalent to (c, d) if and only if $ad = bc$.

A. Use (2) and (3) to write out the equation that is equivalent to $[(a, b)] = [(c, d)]$.

B. Use (2) and (3) to write out the equation that is equivalent to $[(e, f)] = [(g, h)]$.

C. Use (1) and (3) to write out the equation that is equivalent to $[(a, b)] \oplus [(e, f)] = [(c, d)] \oplus [(g, h)]$.

D. Show that if A and B are true, then C is true.