480 Let a and b be integer variables. Refine $a' = a+b \ \wedge \ b' = a-b$ by replacing the question marks in the following. Prove that your answer is a refinement.

(a) a:= ?. b:= ?

(b) b:= ?. a:= ?

(c) a:= ? || b:= ?

After trying the question, scroll down to the solution.

(a)		$a := ?.\ b := ?$	
§		$a := a+b.\ b := a - 2\times b$	expand second assignment
	$=$	$a := a+b.\ a' = a \ \wedge\ b' = a - 2\times b$	substitution law
	$=$	$a' = a+b \ \wedge\ b' = a-b$	
(b)		$b := ?.\ a := ?$	
§		$b := a-b.\ a := 2\times a - b$	expand second assignment
	$=$	$b := a-b.\ a' = 2\times a - b \ \wedge\ b' = b$	substitution law
	$=$	$a' = a+b \ \wedge\ b' = a-b$	
(c)		$a := ? \parallel b := ?$	
§		$a := a+b \parallel b := a-b$	partition
	$=$	$a' = a+b \ \wedge\ b' = a-b$	