Worksheet for Hamilton Path Algorithm for 2-trees

The variables needed for a 2-tree algorithm for counting Hamilton Paths are:

Variable	Subgraph reduced onto (a, b)	Endpoints
$P_1(a, b)$	Path from w to a to b to x	$w = a,\ x = b$
$P_1(\bar{a}, b)$	Path from w to a to b to x	$w \neq a,\ x = b$
$P_1(a, \bar{b})$	Path from w to a to b to x	$w = a,\ x \neq b$
$P_1(\bar{a}, \bar{b})$	Path from w to a to b to x	$w \neq a,\ x \neq b$
$P_2(a, b)$	Two paths from w to a and from b to x	$w = a,\ x = b$
$P_2(\bar{a}, b)$	Two paths from w to a and from b to x	$w \neq a,\ x = b$
$P_2(a, \bar{b})$	Two paths from w to a and from b to x	$w = a,\ x \neq b$
$P_2(\bar{a}, \bar{b})$	Two paths from w to a and from b to x	$w \neq a,\ x \neq b$

1. What are the initial values for these variables? Fill in the following chart.

Variable	Initial value
$P_1(a, b)$	
$P_1(\bar{a}, b)$	
$P_1(a, \bar{b})$	
$P_1(\bar{a}, \bar{b})$	
$P_2(a, b)$	
$P_2(\bar{a}, b)$	
$P_2(a, \bar{b})$	
$P_2(\bar{a}, \bar{b})$	

2. Give the update formulas for the following variables. Assume that the two-leaf c is connected to edge (a, b) by edges (a, c) and (b, c).

$P_1(a, b)$
$P_1(\bar{a}, b)$
$P_2(a, b)$
$P_2(\bar{a}, b)$

3. Give the formula for the number of Hamilton Paths when one edge (a, b) remains.