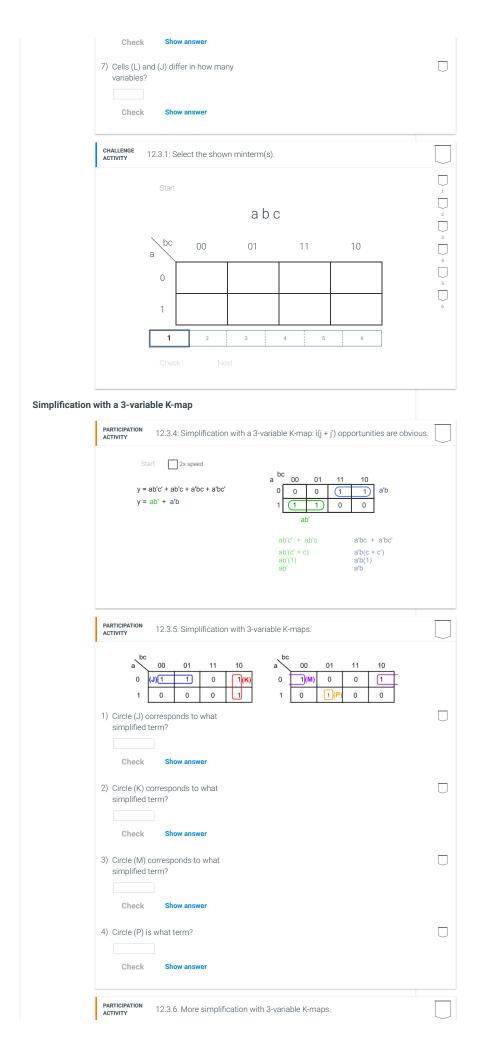
12.3 3- and 4-variable K-maps

3-variable K-map

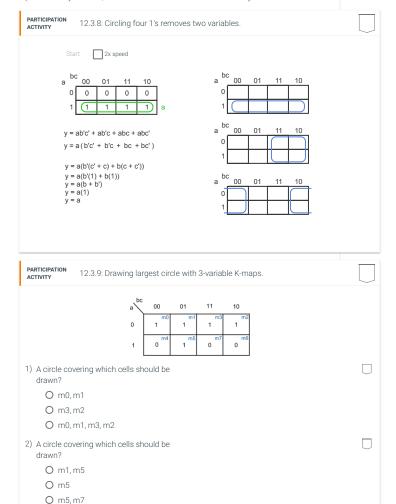
A K-map for three variables has two variables across the top. For adjacent columns to differ in only one variable, note that the columns don't count up in binary (00, 01, 10, 11), but rather are 00, 01, 11, 10. Cells on the far left and far right also differ by one variable so are also "adjacent"; the K-map wraps like a bracelet.

PARTICIPATION ACTIVITY 12.3.1: 3-variable K-map basics.	
Start	
PARTICIPATION ACTIVITY 12.3.2: Click a cell to show/hide the corresponding minterm.	
bc 00 01 11 10	
0	
1	
PARTICIPATION ACTIVITY 12.3.3: 3-variable K-map.	
1 0 0 1(K) 0	
Given function y = a'b'c' + abc + a'bc, represented in the above figure's K-map. 1) (J) corresponds to which minterm? Check Show answer	
2) (K) corresponds to which minterm?	
Check Show answer	
3) (L) should have what value (0 or 1)?	
Check Show answer	_
4) (M) should have what value (0 or 1)?	Ų
Check Show answer 5) Cells (L) and (K) differ in what variable: a, b, or c?	
Check Show answer 6) Cells (L) and (M) differ in what variable: a, b, or c?	



1 0 1 M 0 0 1 0 P 1 1 Q 0 1) Circle (L) is what simplified term? Check Show answer 2) Circle (M) is what simplified term? Check Show answer 3) Is circle (P) necessary? Type: yes or no Check Show answer 4) Is circle (Q) necessary? Type: yes or no	0
2) Circle (M) is what simplified term? Check Show answer 3) Is circle (P) necessary? Type: yes or no Check Show answer	
3) Is circle (P) necessary? Type: yes or no Check Show answer	
Check Show answer	U
4) Is circle (Q) necessary? Type: yes or no	
Check Show answer 5) Is circle (S) a good circle? Type: yes or no	
Check Show answer	
PARTICIPATION ACTIVITY 12.3.7: 3-variable K-map simplification.	
CHALLENGE ACTIVITY 12.3.2: Add fewest and largest circles to cover all the 1s.	
	1 2 3 4 5 5 6 6 7 7
CHALLENGE ACTIVITY 12.3.3: Write the simplified term or terms.	1 2 2 3 4 5 5

A circle may encompass four adjacent 1's, which removes two variables rather than just one.



4-variable K-map

A K-map can be drawn for four variables. Top and bottom rows are adjacent (as are left and right columns). Valid circle sizes are 1, 2, 4, 8, or 16 cells.

