Name _____

Introduction: on your own, follow the instructions then hand in when completed. You may discuss this assignment only with your classmates, the TA, a lab consultant, and/or the professor.

This assignment exercises your ability to simplify Boolean expressions and draw their circuit diagrams.

Use the tutorial in http://web.stcloudstate.edu/aanda/cs200/IntegratedCircuits.pdf

For each of the following Boolean expressions:

1. draw the original circuit
2. draw the truth table
3. simplify (show all algebraic steps)
4. verify that the original and simplified circuits are equivalent (they generate the same truth table)
5. draw the simplified circuit

I. ab’ + ba

II. ab + ba’+ a’b’

III. abc + ba’ + abc’

IV. c(ab + b'a') + ba' + abc'

1. $x + 0 = x$	2. $x \bullet 1 = x$	
3. $x + 1 = 1$	4. $x \bullet 0 = 0$	
5. $x + x = x$	6. $x \bullet x = x$	
7. $x + x' = 1$	8. $x \bullet x' = 0$	
9. $(x')' = x$		
10. $x + y = y + x$	11. $xy = yx$	Commutative
12. $x + (y + z) = (x + y) + z$	13. $x(yz) = (xy)z$	Associative
14. $x(y + z) = xy + xz$	15. $x + yz = (x + y)(x + z)$	Distributive
16. $(x + y)' = x'y'$	17. $(xy)' = x' + y'$	DeMorgan's