Lab 6 – Theorems

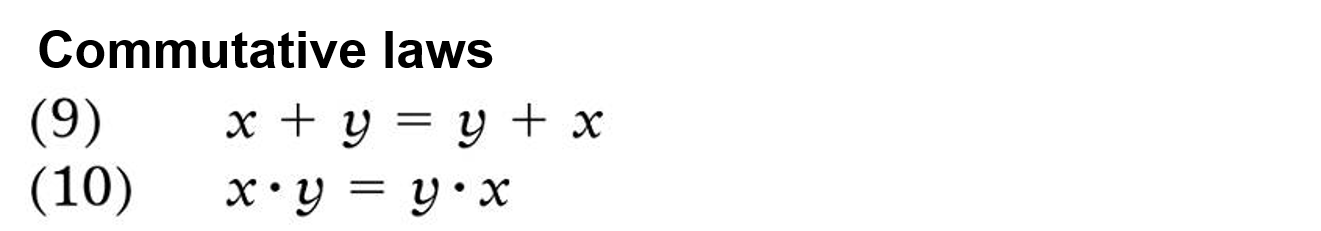
Names: ­­­­­­­­­­­­­­­­Nathaniel Paulus, Austin Denney

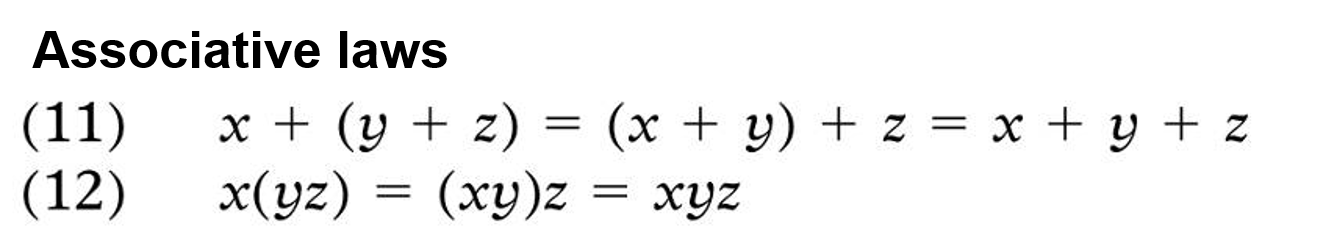
Date: October 13, 2017

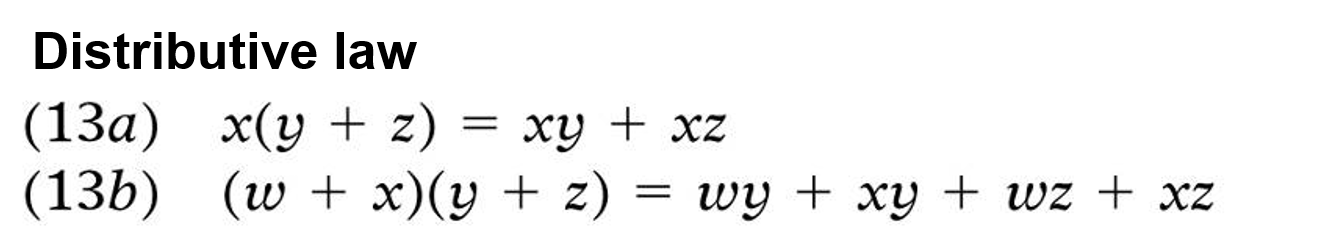
The purpose of this lab is to:

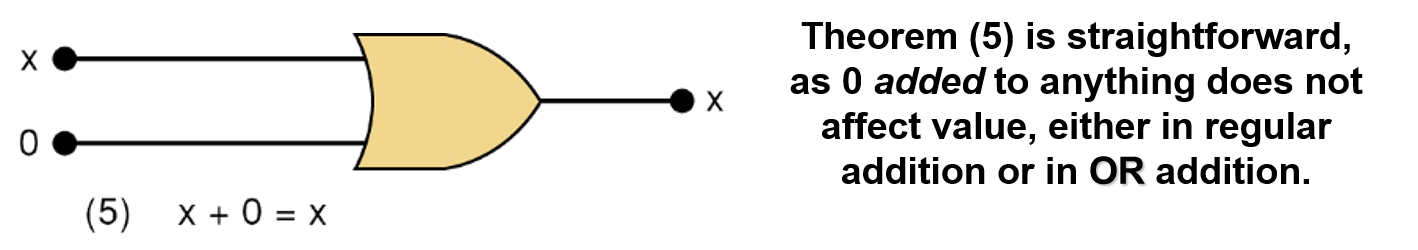
Verify as many of the 17 Theorems with Multisim

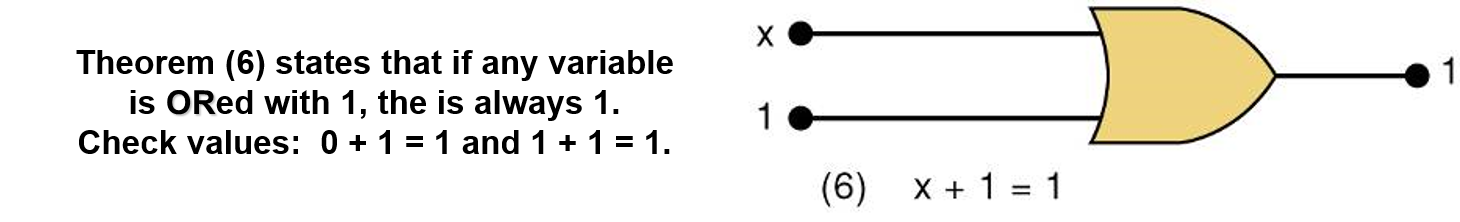
Using Multisim simulate the Theorems and record in tables below. Then compare simulation results to the 17 Theorems.

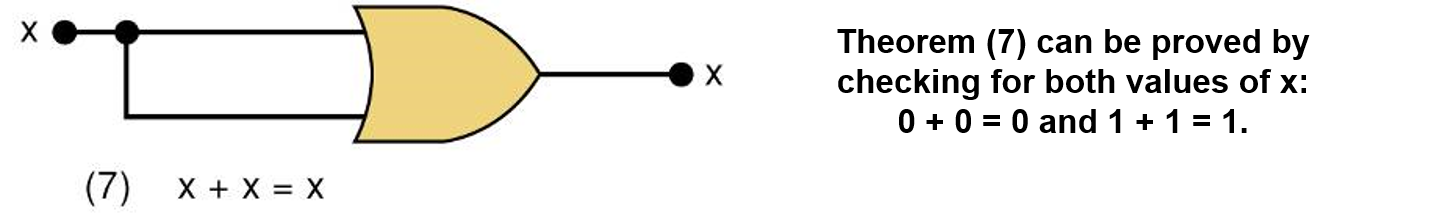


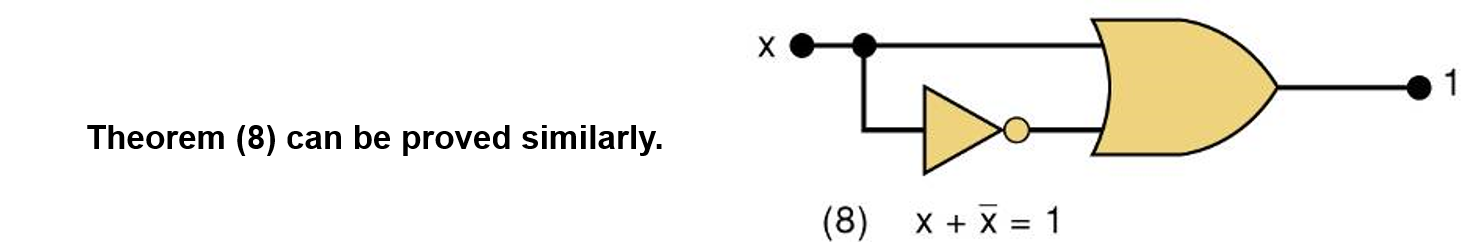


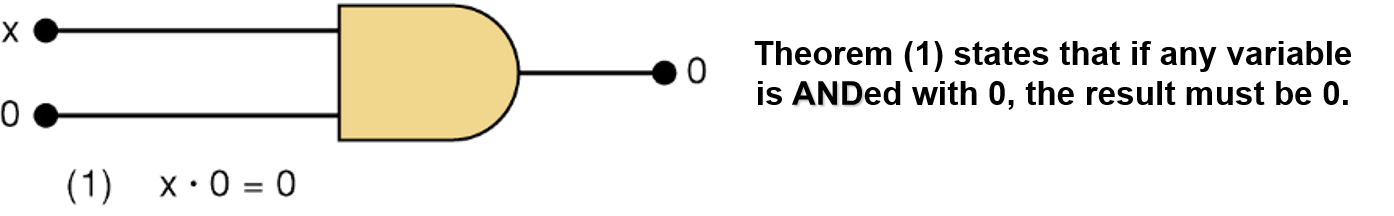


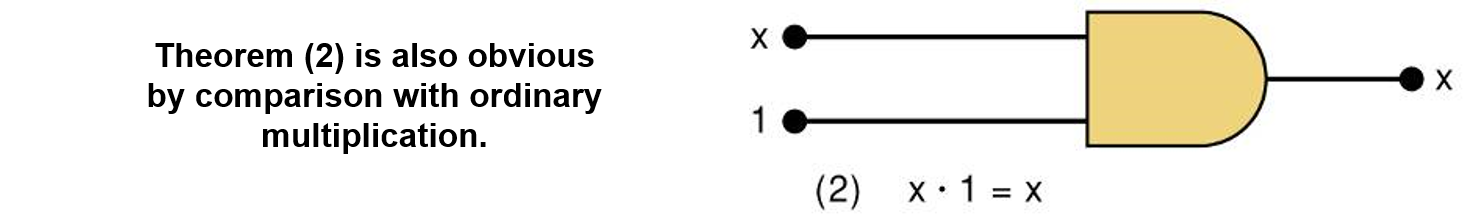


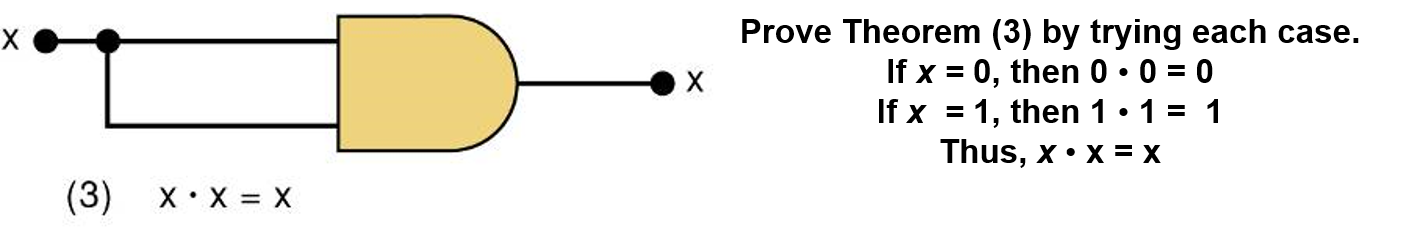


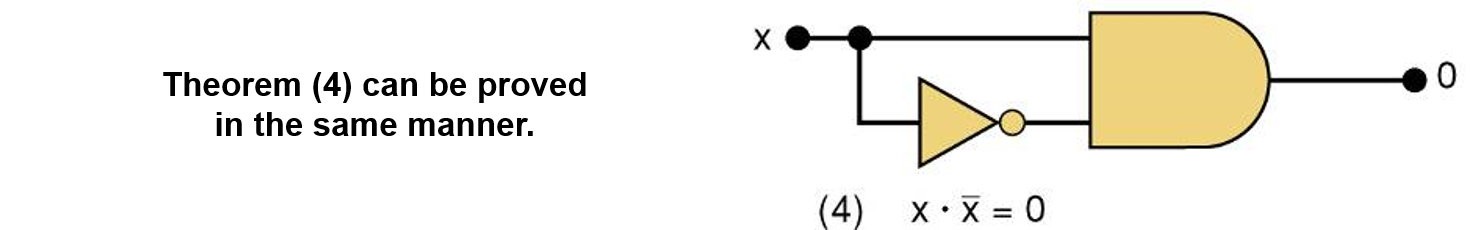




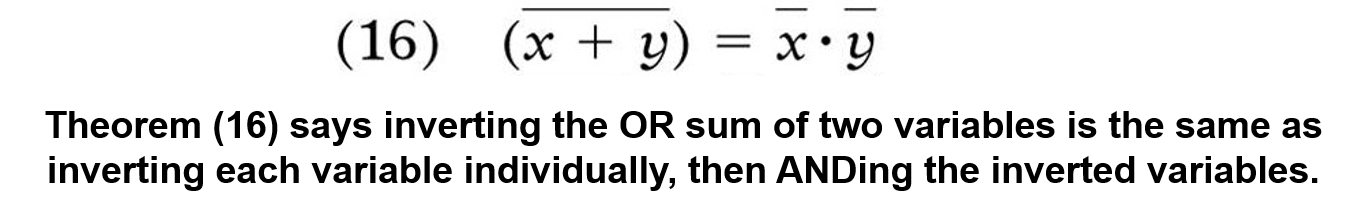


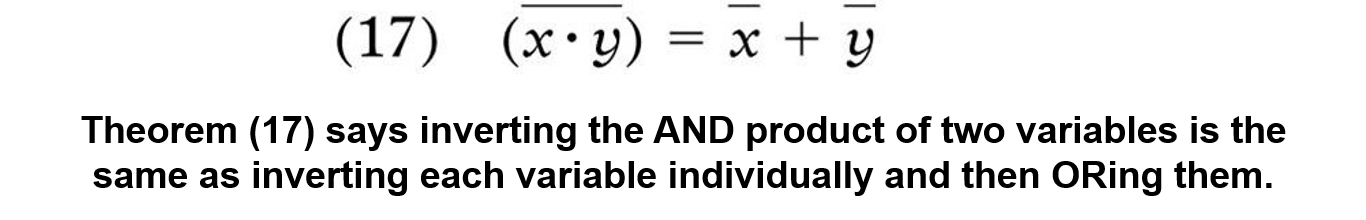


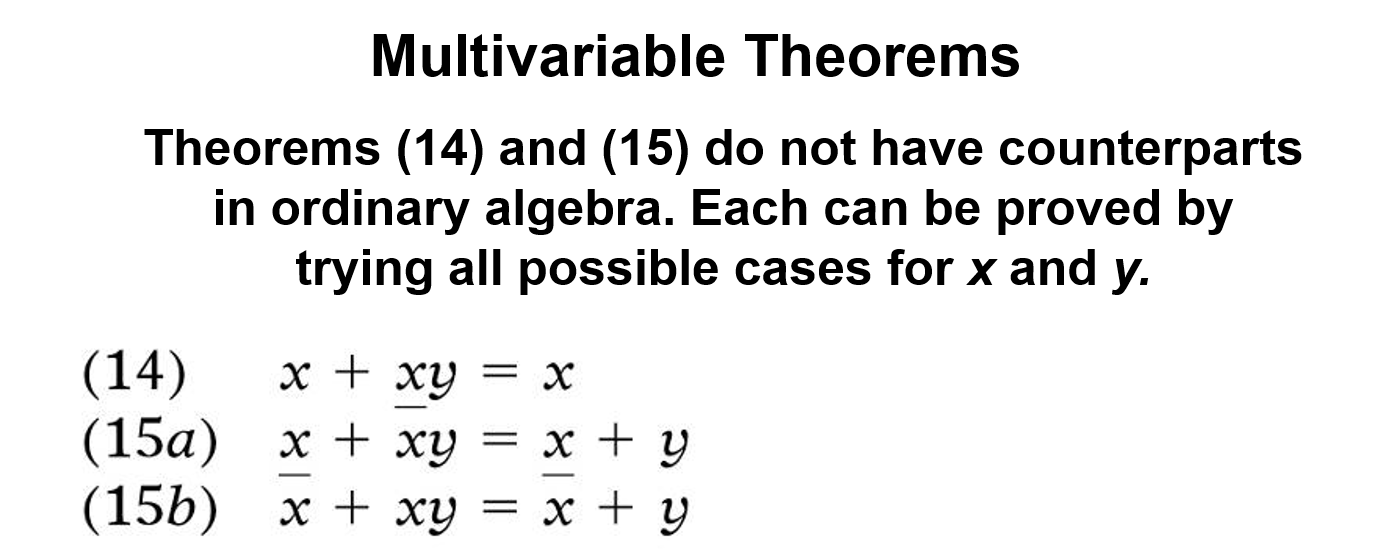




*You do not need to “prove” Theorems 9 – 12 with Multisim*







**DeMorgan’s theorems**

Theorem 13a

|  |  |  |  |
| --- | --- | --- | --- |
| Simulated | | | |
| X | Y | Z | 13a |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

Theorems 14, 15a, 15b, 16 and 17

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Simulated | | | | | | |
| X | Y | 14 | 15a | 15b | 16 | 17 |
| 0 | 0 |  |  |  |  |  |
| 0 | 0 |  |  |  |  |  |
| 0 | 1 |  |  |  |  |  |
| 0 | 1 |  |  |  |  |  |
| 1 | 0 |  |  |  |  |  |
| 1 | 0 |  |  |  |  |  |
| 1 | 1 |  |  |  |  |  |
| 1 | 1 |  |  |  |  |  |

Theorem 13b

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Simulated | | | | |
| W | X | Y | Z | 13b |
| 0 | 0 | 0 | 0 |  |
| 0 | 0 | 0 | 1 |  |
| 0 | 0 | 1 | 0 |  |
| 0 | 0 | 1 | 1 |  |
| 0 | 1 | 0 | 0 |  |
| 0 | 1 | 0 | 1 |  |
| 0 | 1 | 1 | 0 |  |
| 0 | 1 | 1 | 1 |  |
| 1 | 0 | 0 | 0 |  |
| 1 | 0 | 0 | 1 |  |
| 1 | 0 | 1 | 0 |  |
| 1 | 0 | 1 | 1 |  |
| 1 | 1 | 0 | 0 |  |
| 1 | 1 | 0 | 1 |  |
| 1 | 1 | 1 | 0 |  |
| 1 | 1 | 1 | 1 |  |

Theorem 1-8

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Simulated | | | | | | | | |
| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 0 |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |

(The tables above do not appear to match the schema of the data intended to fit in them. See accompanying spreadsheet for truth tables and recorded values from the lab).

Observations: Many of the theorems are very similar to mathematical theorems, because the operators in many instances have similar properties.