Boolean Algebra and Gates Worksheet **TEJ4M**

Using laws of Boolean algebra, and/or truth tables as necessary, simply the following expressions (show all of your work):

a) $\overline{\overline{A} + \overline{B}}$

b) $\overline{(\overline{A \bullet A}) \bullet (B \bullet B)}$

c) $\overline{\overline{AB} + \overline{AC}}$

d) $A(\overline{B+AC}+\overline{A})$

e) $\overline{\overline{J+KJL}}$

f) $\overline{\overline{XY}+Z}$

g) $\overline{\overline{XY}\,\overline{ZY}}$

h) $\overline{\overline{(\overline{AB}+C)}B}$

f) $A(\overline{B+AC}+\overline{A})$ → $B'(AC)'$

$A(\overline{B}\cdot\overline{AC}+\overline{A})$

$A(\overline{B}\cdot(\overline{A}+\overline{C})+\overline{A})$

$A(\overline{B}\,\overline{A}+\overline{B}\,\overline{C}+\overline{A})$

$A\overline{B}\,\overline{A}+A\overline{B}\,\overline{C}+\overline{A}\,\overline{A}$

0 0

$= A\overline{B}\,\overline{C}$

e) $\overline{J+K}JL$

$\overline{AB} \neq \overline{A}\,\overline{B}$

$\overline{J}\,\overline{K}JL$ 0

$\overline{0} = 1$

g) $\overline{XYZ}Y$

$\overline{AB} = \overline{A}+\overline{B}$

Let $A = \overline{XYZ}$

$\overline{X}+\overline{Y}$

$*\ XY\overline{Z}+\overline{Y}$

h) $\overline{(AB+C)}B$

$\overline{(\overline{AB}+C)}+\overline{B}$

$(\overline{\overline{AB}\,\overline{C}})+\overline{B}$

$AB\overline{C}+\overline{B}$

Let $X = A\overline{C}$

rewrite as:

$BX+\overline{B}$