## CSCI 2330 - Integer Logic Exercises

Let $u \mathbf{x}$ be an arbitrary unsigned int and let $\mathbf{x}$ and $\mathbf{y}$ be arbitrary signed ints (in 32 bits). Assume that all constants are signed. For each expression below, decide whether the expression is true for all variable values or potentially false. If the latter, find a counterexample to demonstrate (i.e., give specific value(s) of the variable(s) for which the expression is false).

Hint: $\mathbf{T}_{\text {min }}$ often causes surprising results.

1. $u x>=0$
2. $u x>-1$
3. if $\mathrm{x}>0 \& \& \mathrm{y}>0$ then $(\mathrm{x}+\mathrm{y})>0$
4. if $\mathrm{x}>=0$ then $-\mathrm{x}<=0$
5. if $\mathrm{x}<=0$ then $-\mathrm{x}>=0$
6. if $\mathrm{x}>\mathrm{y}$ then $-\mathrm{x}<-\mathrm{y}$
7. if $x \& 7=7$ then $(x \ll 30)<0$
8. ( $\mathrm{x} \mid-\mathrm{x}) \gg 31=-1$
