cgt **homework 5** **do not hand in** **no marks**

1. Let $G =$ clobber(xxxo). Let $H =$ clobber(xxo). Draw game trees for G, H, and $G - H$. Which, if any, of these holds? Prove your answer. $G = H$ $G < H$ $G > H$ $G||H$

2. Explain why $G = 1* = 1 + *$ is equal, but not identical, to $H = \{1 \mid 1\}$.

3. For each outcome class $\mathcal{P}$, $\mathcal{N}$, $\mathcal{L}$, $\mathcal{R}$, find two unequal games in that class or explain why that is not possible.

4. Let G and P be games where P is a P-position.

   i) Assume that player X wins G as player t (1st or 2nd). Prove that player X wins $G + P$ as player t.

   ii) Assume that player Y wins $G + P$ as player t. Prove that player Y wins G as player t. Hint: use i), contradiction, and no draws.

5. $A < B$ iff _____ is a _____position. $B = C$ iff _____ is a _____position.

   Explain why $A - B$ equals $A - B + C - C$.

   Assume $X = Y$: explain why $A - X + Y - Y$ equals $A - Y$. Hint: use previous question.

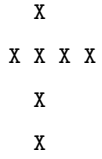
   Assume $A < X$ and $X = Y$. Prove $A < Y$. Hint: previous question.

6. In notation (give all left and right options), describe $2*$. Repeat for $*2$.

   Which of $2*$, $*2$ — if either — is a nimber? Prove/disprove: $*2 = *$.

7. Give a domineering game that equals $-1/2$. Prove that $-1/2 + -1/2 = -1$.

8. Find a 5-cell domineering position equal to $\{-1 \mid -1\}$.
   Prove that this domineering position equals $*$.



9. Assume $G = \{L_1 L_2 L_3 \ldots | R_1 R_2 R_3 \ldots\}$. If $L_1 < L_2$ then option _____ dominates option _____ and so $G =$ _____ . If $R_1 < R_2$ then option _____ dominates option _____ and so $G =$ _____

10. Recall: for $n \geq 1$, $n = \{n - 1 \mid \}$. Prove these: $\{-3|16\} = 0$ $\{1|3\} = 2$ $\{1|9\} = 2$ $\{2|9\} = 3$