

$$\begin{aligned}
((A \downarrow A) \downarrow (B \downarrow B)) \downarrow (A \downarrow B) &= \overline{\overline{\overline{A \vee A \vee B \vee B \vee A \vee B}}} = \overline{\overline{\overline{A \vee B \vee A \vee B}}} = (\overline{A \vee B})(A \vee B) = \\
&= \overline{A \vee B} \vee \overline{A \vee B} = \overline{\overline{\overline{A \vee B}}} = \overline{\overline{\overline{A \vee B}}} = \overline{\overline{\overline{A \vee B}}} = \overline{\overline{\overline{A \vee B}}} = (A \uparrow (B \uparrow B)) \uparrow (B \uparrow (A \uparrow A))
\end{aligned}$$