

$$\begin{aligned}
\overline{ABC \vee B(\overline{C \vee D})} &= \overline{ABC} \overline{B(\overline{C \vee D})} = (\overline{A} \vee \overline{B} \vee \overline{C})(\overline{B \vee \overline{C \vee D}}) = (\overline{A} \vee \overline{B} \vee \overline{C})(\overline{B \vee \overline{\overline{C \vee D}}}) = \\
&= (\overline{A} \vee \overline{B} \vee \overline{C})(\overline{B \vee CD}) = \overline{A} \overline{B} \vee \overline{A} \overline{C} D \vee \overline{B} \overline{B} \vee \overline{B} C D \vee \overline{B} \overline{C} \vee C \overline{C} D = \\
&= \overline{A} \overline{B} \vee \overline{A} \overline{C} D \vee \overline{B} \vee \overline{B} C D \vee \overline{B} \overline{C} \vee \perp = (\overline{B} \vee \overline{A} \overline{B} \vee \overline{B} C D \vee \overline{B} \overline{C}) \vee \overline{A} \overline{C} D = \overline{B} \vee \overline{A} \overline{C} D
\end{aligned}$$