

$$\begin{aligned}
 1. \text{ a) } & (x \wedge \neg y) \vee (\neg x \wedge \neg y) \vee (\neg x \wedge y) = \\
 & = (x \wedge \neg y) \vee [(x \wedge \neg y) \vee (\neg x \wedge y)] = \\
 & = (x \wedge \neg y) \vee [\neg x \wedge (y \vee \neg y)] = \\
 & = (x \wedge \neg y) \vee (\neg x \wedge 1) = \\
 & = (x \wedge \neg y) \vee \neg x = \\
 & = (\neg x \vee x) \wedge (\neg x \vee \neg y) = \\
 & = 1 \wedge (\neg x \vee \neg y) = \\
 & = \neg x \vee \neg y = \\
 & = \neg(x \wedge y)
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } & \neg(\neg(x \wedge y \wedge z) \wedge \neg(x \wedge y \wedge \neg z) \wedge (x \wedge \neg y \wedge z)) = \\
 & = \neg[(\neg(x \wedge y \wedge z)) \wedge \neg((x \wedge y) \wedge z) \wedge (x \wedge \neg y \wedge z)] = \\
 & = [\neg(\neg(x \wedge y) \vee \neg z)] \wedge [\neg(\neg(x \wedge y) \vee z)] \wedge (x \wedge \neg y \wedge z) = \\
 & = (x \wedge y \vee z) \wedge (\neg x \vee \neg y \vee \neg z) \wedge (x \wedge \neg y \wedge z) = \\
 & = (\underbrace{x \wedge y}_{1} \vee x \wedge y \vee x \wedge z \vee \underbrace{\neg x \wedge y}_{y} \vee \underbrace{\neg x \wedge \neg y \vee \neg z \wedge y}_{\neg z \wedge z}) \wedge (x \wedge \neg y \wedge z) = \\
 & = (x \wedge y \vee x \wedge z \vee \neg x \wedge y \vee \neg x \wedge \neg y \vee \neg z \wedge y) \wedge (x \wedge \neg y \wedge z) = \\
 & = x \wedge y \wedge z \vee x \wedge y \wedge z \vee 0 \vee x \wedge y \wedge z \vee x \wedge y \wedge z \vee 0 \vee 0 = \\
 & = x \wedge y \wedge z
 \end{aligned}$$