

calc_logic_example

Student Group

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$$\begin{aligned} & \overline{a \vee (b \wedge (\bar{a} \vee c) \wedge 1) \vee a} \wedge \\ & \overline{ab} \end{aligned}$$

example for a simplification with the rule for boolean algebra

$$\begin{aligned} & \overline{a \vee (b \wedge (\bar{a} \vee c) \wedge 1) \vee a} \wedge \\ & \overline{ab} \end{aligned}$$

At first we will switch the representation to the following:

$$\begin{aligned} & \overline{a \vee (b \wedge (\bar{a} \vee c) \wedge 1) \vee a} \wedge \\ & \overline{ab} \end{aligned}$$

At first we will switch the representation to the following:

$$\begin{aligned} & \overline{a + (b \cdot (\bar{a} + c) \cdot 1) + a} \wedge \overline{ab} \\ & \overline{ab} \end{aligned}$$

1. $\color{blue}\{\text{Neutral Element}\}$

$$\begin{aligned} & \overline{a + (b \cdot (\bar{a} + c) \cdot 1) + a} \wedge \overline{ab} \\ & \overline{ab} \end{aligned}$$

1. $\color{blue}\{\text{Neutral Element}\}$

```
\begin{align*} \begin{array}{l} (a + (b \cdot (a + c)) + a) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

2. $\color{blue}{\text{Commutative Law}}$

```
\begin{align*} \begin{array}{l} (a + \color{blue}{(b \cdot (a + c))} + a) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

2. $\color{blue}{\text{Commutative Law}}$

```
\begin{align*} \begin{array}{l} (a + a + (b \cdot (a + c))) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

3. $\color{blue}{\text{Idempotence}}$

```
\begin{align*} \begin{array}{l} (\color{blue}{a + a} + (b \cdot (a + c))) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

3. $\color{blue}{\text{Idempotence}}$

```
\begin{align*} \begin{array}{l} (a \quad + (b \cdot (a + c))) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

4. $\color{blue}{\text{Distributive Law}}$

```
\begin{align*} \begin{array}{l} (a \quad + (\color{blue}{b \cdot (a + c)})) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

4. $\color{blue}{\text{Distributive Law}}$

```
\begin{align*} \begin{array}{l} (a \quad + ((b \cdot a) + (b \cdot c))) & \color{white}{\overline{ab}} \\ \quad \quad \quad \quad \quad \quad \quad & \quad \quad \quad \quad \quad \quad \quad \end{array} \end{align*}
```

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