Simplify Boolean expression 1

Challenge 2

Simplify this Boolean expression:

$(A \vee B) \wedge (B \vee B) \wedge (B \vee A)$

The expression simplifies to:

- True (1)
- False (0)
- A
- B

Simplify Boolean expression 3

Challenge 2

Using the laws of Boolean algebra, simplify this Boolean expression:

$B \wedge (A \vee A) \vee B \wedge \neg A$

The expression simplifies to:

- False (0)
- A
- B
- True (1)

Quiz:
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Simplify Boolean expression 5

Challenge 2

Using the laws of Boolean algebra, simplify this Boolean expression:

$\neg(\neg(A \wedge B)) \vee A \vee B \vee C$

The expression simplifies to:

- $(A \wedge B) \vee C$
- $A \vee B \vee C$
- $\neg C$
- False (0)

Quiz:
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Simplify Boolean expression 7

Challenge 2

Using the laws of Boolean algebra, simplify this Boolean expression:

$\neg(A \vee \neg B) \wedge (\neg\neg A \wedge C) \wedge \neg(C \wedge A)$

What does the expression simplify to?

- $\neg A \wedge B \vee C$
- $A \wedge B \vee \neg C$
- False (0)
- $A \wedge B \vee C$

Quiz:
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Simplify Boolean expression 9

Challenge 2

A Boolean expression can often be expressed using different logic, often in much simpler form.

Three of the following Boolean expressions are correct (in that the left part has the same logic as the right part). Select the **three** correct options.

- [ ] $A \wedge (A \vee B) = B$
- [ ] $A \wedge \neg A = 1$
- [ ] $A \vee 1 = 1$
- [ ] $A \wedge 1 = 1$
- [ ] $A \vee B = \neg(\neg A \wedge \neg B)$
- [ ] $A \wedge (A \vee B) = A$

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Simplify Boolean expression 11

Challenge 2

There is more than one way to make use of the laws of Boolean algebra to simplify the expression below:

$(A \vee B) \wedge (B \vee C \wedge (D \vee \neg D))$

One option is:

$(A \vee B) \wedge (B \vee C \wedge (D \vee \neg D))$

$= (A \vee B) \wedge (B \vee C \wedge 1)$

$= (A \vee B) \wedge (B \vee C)$

$= B \vee (A \wedge C)$

Select a method from the options below that will also simplify the Boolean expression given above:

- $(A \vee B) \wedge (B \vee C \wedge (D \vee \neg D))$

  $= (A \vee B) \wedge (B \vee C \wedge 1)$

  $= (A \vee B) \wedge (B \vee C)$

  $= (A \vee B) \wedge (A \vee C) \wedge (B \vee B) \wedge (B \vee C)$

  $= (A \vee B) \wedge (A \vee C) \wedge 1 \wedge (B \vee C)$

  $= (A \vee B) \wedge (A \vee C) \wedge (B \vee C)$

  $= B \vee (A \vee C) \wedge (A \vee C)$

  $= B \vee (A \wedge C)$

- $(A \vee B) \wedge (B \vee C \wedge (D \vee \neg D))$

  $= (A \vee B) \wedge (B \vee C \wedge 1)$

  $= (A \vee B) \wedge (B \vee C)$

  $= (A \wedge B) \vee (A \wedge C) \vee (B \wedge B) \vee (B \wedge C)$

  $= (A \wedge B) \vee (A \wedge C) \vee B \vee (B \wedge C)$

  $= (A \wedge B) \vee (A \wedge C) \vee B$

  $= B \vee (A \wedge B) \vee (A \wedge C)$

  $= B \vee (A \wedge C)$

Quiz:
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Simplify Boolean expression 4

Challenge 2

Use the laws of Boolean algebra to simplify the Boolean expression below.

$(B \vee \neg B) \wedge (B \vee A)$

Which of the following options shows the simplest equivalent logic?

- $B \vee A$
- 0
- $B \vee \neg B \wedge A$
- 1

Quiz:
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Simplify Boolean expression 6

Challenge 2

Use the laws of Boolean algebra to simplify the Boolean expression below.

$(A \wedge \neg B) \vee (A \wedge B)$

Which of the following options shows the simplest equivalent logic?

- 1
- A
- $A \wedge B$
- $A \wedge (B \vee \neg B)$

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Simplify Boolean expression 8

Challenge 2

Use the laws of Boolean algebra to simplify the Boolean expression below.

$X \wedge (Y \vee 1)$

Which of the following options shows the simplest equivalent logic?

- X
- $X \wedge Y$
- 1
- 0

Quiz:
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Simplify the Karnaugh map 1

Challenge 2

The truth table for a Boolean expression has been put into the Karnaugh map below.

B \ A	0	1
0	0	1
1	1	1

A Karnaugh map

Write the simplest Boolean expression to represent the given Karnaugh map

- $A \veebar B$
- $A \vee B$
- $\neg A \vee \neg B$
- $A \wedge B$