# HOMEWORK

## EXERCICE 1

Determine the values of A, B, C, and D that makes this expression **false**:

!A and B and !C and D

A. A = 1, B = 0, C = 0, D = 0

Answer: 0 and 0 and 1 and 0 =false

B. A = 1, B = 0, C = 1, D = 0

Answer: 0 and 0 and 0 and 0 =false

C. A = 0, B = 1, C = 0, D = 0

Answer: 1 and 1 and 1 and 0 =false

D. A = 1, B = 0, C = 1, D = 1

Answer: 0 and 0 and 0 and 1 =false

## EXERCICE 2

Determine the values of A, B, C, and D that makes this expression **true**:

!A . B . !C . D

A. A = 0, B = 1, C = 0, D = 1

Answer: 1 and 1 and 0 nad 1= true

B. A = 0, B = 0, C = 0, D = 1

Answer: 1 nad 0 nad 1 and 1=true

C. A = 1, B = 1, C = 1, D = 1

Answer: 0 and 0 and 0 and 1= true

D. A = 0, B = 0, C = 1, D = 0

Answer: 1 and 1 and 0 and 0= true

## EXERCICE 3

True or false?

AC + ABC = AC

To solve this problem:

1. Try using a TRUTH table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | AC+ABC | AC |
| false | false | false | false | false |
| false | false | true | true | fase |
| false | true | true | false | False |
| true | false | true | true | true |
| true | true | false | false | false |
| true | true | false | false | false |

The answer is false

1. Try using the 7 rules of simplification

AC+ABC=AC

=( A and C) or (A and B and C)

=(A and B) or A

=A and (B or True)

=A nad (C or True)

=AC

## EXERCICE 5

True or false?

A + AB = A

To solve this problem:

1. Try using a TRUTH table

|  |  |  |
| --- | --- | --- |
| A | B | A+AB |
| flase | false | false |
| false | true | false |
| true | false | true |
| true | true | true |

The answer is true

1. Try using the 7 rules of simplification

A + AB = A

=A or (A and B )=A

=A or ( A and B)=(A or B) and (A or C)

=(A or A) and (A or B)

=A and A

=A

## EXERCICE 6

True or false?

A + !AB = A + B

To solve this problem:

1. Try using a TRUTH table

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A+!AB | A+B |
| false | false | true | false |
| false | true | false | true |
| true | false | true | true |
| true | true | false | true |

The answer is false

1. Try using the 7 rules of simplification

A or !(A and B)

=A or !A and !B

=A or B =A+B

In the following exercises: you need to use the table of truth to simplify the expression as much as possible

## EX-14

A == True and (B == False or A == False) and B == True

|  |  |  |
| --- | --- | --- |
| **a** | **b** | **a == True and (b == False or a == False) and b == True** |
| True | True | false |
| True | False | true |
| False | True | false |
| False | False | false |

The expression is equivalent to:( A and !B) or (A and B)

## EX-15

(A == True and B == False) or (A == False and B == True)

|  |  |  |
| --- | --- | --- |
| **a** | **b** | **(a == True and b == False) or (a == False and b == True)** |
| True | True | false |
| True | False | true |
| False | True | false |
| False | False | false |

The expression is equivalent to: :( A and !B) or (A and !B)

## EX-16

(B or !B) and A

|  |  |  |
| --- | --- | --- |
| **a** | **b** | **(B or ! B) and A** |
| True | True | true |
| True | False | true |
| False | True | false |
| False | False | false |

The expression is equivalent to:(A and B) or A