# 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 false

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

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

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

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

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

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

## EXERCICE 3

True or false?

AC + ABC = AC true

To solve this problem:

1. Try using a TRUTH table

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

1. Try using the 7 rules of simplification

AC + ABC = AC or (AC and B)

= AC and (B or True)

= AC and True

= AC

## EXERCICE 5

True or false?

A + AB = A true

To solve this problem:

1. Try using a TRUTH table

|  |  |  |
| --- | --- | --- |
| A | B | A+ AB |
| False | True | False |
| False | False | False |
| True | False | False |
| True | True | True |

1. Try using the 7 rules of simplification

A + AB = A or (A and B)

= A and (B or True)

= A and true

## 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 | False | False |
| False | True | True | True |
| True | True | true | True |
| True | False | True | true |

1. Try using the 7 rules of simplification

A + !AB = 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 | True==True and (True==False or True == False) and True ==False :true |
| True | False | True==True and (False==False or True == False) and False == True : False |
| False | True | False == True and ( True == False or False == false ) and True == True: False |
| False | False | False == true and (False == False or False == False) and False == True: False |

The expression is equivalent to:

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

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

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

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

## 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 | (True== True and True == False) or ( True == False and True==true) |
| True | False | (True==True and False==False) or (True==False and False==True) |
| False | True | (False== True and True== False) or (False==False and True==True) |
| False | False | (False==true and False==False) or (False ==False and False==true) |

The expression is equivalent to:

(A==A and A ==!A) or (A == !A and A==A)

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

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

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

## EX-16

(B or !B) and A

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

The expression is equivalent to:

(A or ! A and !B) and A or B

( B or !B) and A