# 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

!1 and 0 and !0 and 0= False

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

!1 and 0 and !1 and 0= False

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

!0 and 1 and !0 and 0= false

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

!1 and 0 and 1 and 1= false

The values that make this expression false are A B C D

## 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

!0 and 1 and !0 and 1= True

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

!0 and 0 and !0 and 1= False

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

!1 and 1 and !1 and 1= False

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

!0 and 0 and !1 and 0= False

So the values that make this expression true: A( A=0, B=1, C=0)

## EXERCICE 3

True or false?

AC + ABC = AC

To solve this problem:

1. Try using a TRUTH table

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

1. Try using the 7 rules of simplification

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

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

=(C or A) and True

= A and C

## EXERCICE 5

True or false?

A + AB = A

To solve this problem:

1. Try using a TRUTH table

|  |  |  |
| --- | --- | --- |
| A | B | A or ( A and B) |
| True | True | True |
| True | False | True |
| False | True | False |
| False | False | False |

1. Try using the 7 rules of simplification

A + AB= A or (A and B)= A and (B or True)

= A and True

=A

## EXERCICE 6

True or false?

A + !AB = A + B

To solve this problem:

1. Try using a TRUTH table

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A or (!A and B) | A or B |
| True | True | True | True |
| False | False | False | False |
| True | False | True | True |
| False | True | True | True |

1. Try using the 7 rules of simplification

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

= True and (A or B)

= A or 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 | False |
| False | True | False |
| False | False | False |

The expression is equivalent to:

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

The expression is equivalent to:

## 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: