# 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)= (!A and B and !C and D)=(0 and 0 and 1 and 0)=0 false

B. (A = 1, B = 0, C = 1, D = 0)= (!A and B and !C and D)=(0 and 0 and 0 and 0)= 0 false

C. A = 0, B = 1, C = 0, D = 0=(!A and B and !C and D)=(1 and 0 and 0 and 1)= 0 false

D. A = 1, B = 0, C = 1, D = 1=(!A and B and !C and D)=(0 and 0 and 0 and 1)=0 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

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

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

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | C | D | !A.B | !C.D | !A.B.!C.D |
| false | True | false | true | True | True | True |
| False | False | False | True | False | true | False |
| True | True | True | true | false | False | false |
| False | False | True | False | False | False | False |

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

1. Try using the 7 rules of simplification

AC + ABC = AC= AC or (AC and B)

=AC and (B 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 =A |
| False | True | False |
| True | False | True |
| True | True | True |
| False | False | False |

1. Try using the 7 rules of simplification

A + AB =A or false

=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 | True |
| True | True | True | True |
| False | True | false | True |

1. Try using the 7 rules of simplification

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

A and (A or true )

=A =false

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 | True |
| False | True | True |
| 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: