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

A	B	C	D	!A AND B AND !C NAD D
True	False	False	False	False
True	False	True	False	False
False	True	False	False	False
True	False	True	True	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 or B or !C or D
False	True	False	True	True
False	False	False	True	True
True	True	True	True	True
False	False	True	False	True

EXERCICE 3

True or false?

$$AC + ABC = AC$$

To solve this problem:

1- Try using a TRUTH table
2- Try using the 7 rules of simplification

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

1- Try using the 7 rules of simplification

$$AC + ABC = AC \text{ OR } (AC \text{ and } B)$$
$$= AC \text{ and } (B \text{ or } true)$$
$$= AC \text{ AND } TRUE$$
$$= AC$$

EXERCICE 5

True or false?

$$A + AB = A$$

To solve this problem:

1- Try using a TRUTH table
2- Try using the 7 rules of simplification

A	B	AB	A+AB
True	False	False	True
False	False	False	False
False	True	False	False
True	True	False	True

1- Try using the 7 rules of simplification

$$A + AB = A \text{ or } (A \text{ and } B)$$
$$= A \text{ and } (B \text{ or True})$$
$$= A \text{ and True}$$
$$= A$$

EXERCICE 6

True or false?

```
A +  !AB = A + B
```

To solve this problem:

1- Try using a TRUTH table
2- Try using the 7 rules of simplification

A	B	!AB	A + !AB
False	True	True	True
False	False	True	True
True	False	True	True
True	True	False	True

1- Try using the 7 rules of simplification

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

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:

```
(B or !B) and A = A  and (B or !B)
                = A and False
                = false
```