# C3- S3 EXERCICES

SIMPLIFICATIONS

In the following exercises:

1. Demonstrate this equality using the 9 simplification rules you have learnt
2. Confirm this equality with the TRUTH table

EX-7

A and (A or B) = A

1 , using the 9 simplification

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

2, Confirm this equality

|  |  |  |
| --- | --- | --- |
| A | (A or B) | A and (A or B) |
| fales | true | fales |
| true | fales | true |
| true | true | true |

EX-8

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

1, uing the 9 simplification

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

2, Confirm this equality

|  |  |  |
| --- | --- | --- |
| A | B | (A and B) or (A and B) |
| fales | fales | fales |
| true | true | true |
| fales | true | true |

EX-9

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

1, uing the 9 simplification

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

2, Confirm this equality

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A and (!A or B) | A and B |
| true | fales | fales | fales |
| fales | true | true | fales |
| true | true | true | true |

EX-10

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

1, uing the 9 simplification

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

2, Confirm this equality

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A or (!A and B) | A or B |
| Fales | Fales | Fales | True |
| Fales | true | Trues | True |
| True | True | Fales | True |

EX-11

A or (A and B) = A

1, uing the 9 simplification

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

2, Confirm this equality

|  |  |  |
| --- | --- | --- |
| A | B | A or (A nad B) |
| Fales | Fales | Fales |
| Fales | True | Fales |
| True | True | True |

EX-12

! ( !C and (!B or !C) ) = C

1, uing the 9 simplification

! ( !C and (!B or !C)= !(!C and !B) or (!C and !C)=!(!Cor !C)=C

2, Confirm this equality

|  |  |  |
| --- | --- | --- |
| C | B | !(!C and (!B or !C) |
| Fales | Fales | Fales |
| true | true | True |
| true | Fales | True |

TABLE OF TRUTH

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

## EX-13

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

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

The expression is equivalent to: (A==True and B==true) or (A==Fales and B ==Fales)

+ (A==true and B==true)

A=true

B=true

( true == true and true ==true)

True and true

true

+ (A== Fales and B ==Fales)

(true==fales And true == fales)

fales and fales

fales

so, true or fales= true