Exercicis de taules de veritat i circuits lògics

1. Sigui la expressió: **(X AND NOT Y) OR (X AND NOT Z)**

● Quantes variables hi té?

*Tres variables*

● Fes la **taula de veritat**

| **X** | **Y** | **Z** | **NOT Y** | **X AND NOT Y** | **X AND NOT Z** | **(X AND NOT Y) OR (X AND NOT Z)** |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 |

● Quantes entrades hi té?

*Tres entrades*

● Comprova que és el mateix resultat si treiem el factor comú: **○ X AND (NOT Y OR NOT Z)**

○ Com ho comproves?

| **X** | **Y** | **Z** | **NOT Y** | **NOT Z** | **NOT Y OR NOT Z** | **X AND (NOT Y OR NOT Z)** |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 |

○ Prova d’aplicar la llei de Morgan.

X AND NOT (Y AND Z)

■ Comprova que també és el mateix resultat.

| **X** | **Y** | **Z** | **Y AND Z** | **NOT (Y AND Z)** | **X AND NOT (Y AND Z)** |
| --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 0 | 0 |

● Quina forma fa servir menys portes lògiques?

*X AND NOT (Y AND Z)*

○ Mira si pots fer servir alguna porta lògica de les que s’ha explicat.

*X AND (Y NAND Z)*

○ Quantes operacions es fan servir?

*Dues*

2. Escriu la taula de veritat per **(A AND B) OR (NOT A AND C)** ● Comprova que és el mateix que **(A OR C) AND (NOT A OR B)**

*Si que dóna lo mateix.*

**(A AND B) OR (NOT A AND C)**

| **A** | **B** | **C** | **A AND B** | **NOT A** | **NOT A AND C** | **(A AND B) OR (NOT A AND C)** |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 |

**(A OR C) AND (NOT A OR B)**

| **A** | **B** | **C** | **A OR C** | **NOT A** | **NOT A OR B** | **(A OR C) AND (NOT A OR B)** |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 1 | 0 | 1 | 1 |