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CRN: 11689

*Solutions:*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **a** | **b** | **c** | **d** | **m** | **f** | **M** | **g** | **f+g** | **f.g** |
| 0 | 0 | 0 | 0 | m0 | 1 | M0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 1 | m1 | 1 | M1 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | m2 | 1 | M2 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | m3 | 1 | M3 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | m4 | 0 | M4 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | m5 | 0 | M5 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | m6 | 0 | M6 | 1 | 1 | 0 |
| 0 | 1 | 1 | 1 | m7 | 0 | M7 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | m8 | 0 | M8 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 | m9 | 0 | M9 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | m10 | 1 | M10 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | m11 | 1 | M11 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | m12 | 0 | M12 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | m13 | 0 | M13 | 1 | 1 | 0 |
| 1 | 1 | 1 | 0 | m14 | 0 | M14 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | m15 | 0 | M15 | 1 | 1 | 0 |

***İ.***

f:

|  |  |
| --- | --- |
| 1st Canonical Form | 2nd Canonical Form |
| a’b’c’d’+a’b’c’d+a’b’cd’+a’b’cd+ab’cd’+ab’cd  -(consensus for each couple from the start)  =a’b’c’+a’b’c+ab’c  -(consensus for the first two terms)  =a’b’+ab’c  -(consensus)  **=a’b’+b’c** | (a+b’+c+d)(a+b’+c+d’)(a+b’+c’+d)(a+b’+c’+d’)(a’+b+c+d)(a’+b+c+d’)  (a’+b’+c+d)(a’+b’+c+d’)(a’+b’+c’+d)(a’+b’+c’+d’)  -(consensus for each couple from the start)  =(a+b’+c)(a+b’+c’)(a’+b+c)(a’+b’+c)(a’+b’+c’)  -(consensus for the first two couple terms)  =(a+b’)(a’+b’)(a’+b+c)  =b’(a’+b+c)  **=a’b’+cb’** |

g:

|  |  |
| --- | --- |
| 1st Canonical Form | 2nd Canonical Form |
| a’b’c’d+a’b’cd’+a’bc’d’+a’bcd’+ab’c’d’+ab’c’d+ab’cd’+ab’cd+abc’d+abcd  -(consensus for each couple from the start)  =a’b’d’+a’bd’+ab’c’+ab’c+abd  -(consensus for the first two couple terms)  =a’d’+ab’+abd  =a’d’+a(b’+bd)  =a’d’+a(b’+d)  **=a’d’+ab’+ad** | (a+b+c+d’)(a+b+c’+d’)(a+b’+c+d’)(a+b’+c’+d’)  (a’+b’+c+d)(a’+b’+c’+d)  -(consensus for each couple from the start)  =(a+b+d’)(a+b’+d’)(a’+b’+d)  -(consensus for the first two terms)  =(a+d’)(a’+b’+d)  =aa’+ab’+ad+a’d’+b’d’+dd’  =ab’+b’d’+ad+a’d’  =a(b’+d)+d’(b’+a’) |

***ii.*** f+g=U0(,7,12,14)

f.g=U1(0,2,10,11)

***iii.***

|  |  |
| --- | --- |
| f+g (SoP) | f.g (SoP) |
| a’b’c’d’+a’b’c’d+a’b’cd’+a’b’cd+a’bc’d’+a’bcd’+  ab’c’d’+ab’c’d+ab’cd’+ab’cd+abc’d+abcd  =a’b’c’+a’b’c+a’bd’+ab’d’+ab’d+abd  =a’b’+ad+a’bd’+ab’d’  =a’(b’+bd’)+a(d+b’d’)  =a’b’+a’bd’+abd+ab’  **=b’+b(a’d’+ad)** | a’b’c’d’+a’b’cd’+ab’cd’+ab’cd  =a’b’d’+ab’c  **=b’(a’d’+ac)** |

***iv.***

|  |
| --- |
| f+g (PoS) |
| (a+b’+c+d’)(a+b’+c’+d’)(a’+b’+c+d)(a’+b’+c’+d)  =(a+b’+d’)(a’+b’+d)  =aa’+ab’+ad+a’b’+b’+b’d+a’d’+b’d’+dd’  =ab’+ad+a’b’+b’+b’d+a’d’+b’d’  **=b’+ad+a’d’** |

***v.***

a b c d