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LISTA 2

01-)

a-) $mx + nx - px = x(m+n-p)$

b-) $2ax^2 - 32a = 2a(x^2 - 16)$

c-) $4m^3 - 6m^2 = 2m^2(2m-3)$

* d-) $x^8 - 1 = (x^4+1)$

e-) $m^2 - mn - 3m + 3n = m(m-n) - 3(m+n)$

$(m-n)(m-3)$

* f-) $x^5 + 2x^4 + x^3 = x^3(x^2+2x+1) = x^3(x+1)(x+1) = x^3(x+1)^2$

2-) $\left[\left(\frac{1}{m^2} - \frac{1}{n^2}\right) \div \left(\frac{1}{m} - \frac{1}{n}\right)\right] \div \frac{m+n}{mn}$

$\left(\frac{\left(\left(\frac{1}{m} - \frac{1}{n}\right)\left(\frac{1}{m} + \frac{1}{n}\right)\right)}{\left(\frac{1}{m} - \frac{1}{n}\right)}\right) / = \left(\frac{\frac{1}{m} + \frac{1}{n}}{\frac{m+n}{mn}}\right) = \left(\frac{\frac{n+m}{mn}}{\frac{m+n}{mn}}\right) = 1$

$\frac{m+n}{mn}$

3-)

a-) $4a^2 - 9b^2 = (2a-3b)(2a+3b) = 4a^2 + 6ab - 6ab - 9b^2$

b-) $(x+y)^2 - y^2 = ((x+y)-y)((x+y)+y) = (x+y-y)(x+y+y) = x(x+2y)$

c-) $(a+b)^2 - (a-b)^2 = ((a+b)+(a-b))((a+b)-(a-b))$

$= (a+b+a-b)(a+b-a+b) = (2a)(2b) = 4ab$

d-) $1^2 - (x+y)^2 = (1+(x+y))(1-(x+y)) = (1+x+y)(1-x+y)$

e-) $(m^4 - 16n^4) = (m^2 - 16n^2)(m^2 - 16n^2) = ((m+16n)(m-16n))((m+16n)(m-16n))$

$= (2m)(2m) = 4m$

f- $\frac{1}{x^2} - \frac{1}{y^2} = \left(\frac{1}{x} + \frac{1}{y}\right)\left(\frac{1}{x} - \frac{1}{y}\right)$

G-) $(x^2 + 2xy + y^2) = "\sqrt{a} = \sqrt{c}" = (\sqrt{x} + \sqrt{y}) = (x+y)^2$

H-)

Paula Dumas

a) Objetivo: Observar o

11

4.

a-) $x^2 + 9x + 20 = \{Raiz = -4, -5\}$ $(x-(-4))(x-(-5)) = (x+4)(x+5)$ //

b-) $x^2 - 9x + 20 = \{Raiz = 5, 4\} = (x-(5))(x-(4)) = (x-5)(x-4)$ //

c-) $y^2 - 10y - 24 = \{Raiz = 12, -2\} = (x-(12))(x-(-2)) = (y-12)(y+2)$ //

d-) $T^2 + 12T - 45 = \{Raiz = 3, -15\} = (x-(3))(x-(-15)) = (T-3)(T+15)$ //

5-)

a-) $x^3 + 8 = (x^3 + 2^3) = (x+2)(x^2 - 2x + 4)$ //

b-) $a^3 + 125 = (a^3 + 5^3) = (a+5)(a^2 - 5a + 25)$ //

c-) $a^3 - 1 = (a^3 - 1^3) = (a-1)(a^2 + a + 1)$ //

d-) $h^3 - 64 = (h^3 - 4^3) = (h-4)(h^2 + 4h + 16)$ //

6-) $\boxed{x^2 + \frac{1}{x^2} = 6}$ $\quad x + \frac{1}{x} = ?$

$(x + \frac{1}{x})^2 = x^2 + 2x \cdot \frac{1}{x} + \frac{1}{x^2}$

$= x^2 + \frac{1}{x^2} + 2$

$= 6 + 2$

$= (x + \frac{1}{x})^2 = 8$

$= x + \frac{1}{x} = \pm\sqrt{8}$

$= \pm 2\sqrt{2}$

7-) $z = \frac{2x - 2y + ax - ay}{a^3 - a^2 - a + 1} \div \frac{2+a}{a^2 - 1}$

Fatoração

$2(x-y) + a(x-y) = (x-y)(2+a)$

$(a^3 - a^2)(-a+1) =$

$a^2(a-1) - 1(a-1) =$

$(a-1)(a^2 - 1)$

$(a-1)(a-1)(a+1)$

$(a^2 - 1) = (a+1)(a-1)$

$(a^2 \pm b^2) = (a+b)(a-b)$

$z = \left(\frac{(x-y)(2+a)}{(a-1)(a-1)(a+1)}\right) = \frac{(x-y)(2+a)}{(a-1)(a+1)(a-1)} \cdot \frac{(a-1)(a-1)}{2+a}$

$\frac{2+a}{(a+1)(a-1)} = \frac{(x-y)}{a-1}$ //

Paula Drama

8-) $y = \frac{3x^3 + 3x^2 - 6x}{x^2 - 4} \div \frac{x^2 - 4x + 4}{x^2 - 2x}$

$= \frac{3x(x-1)(x+2)}{(x-2)(x+2)} \div \frac{(x-2)^2}{x(x-2)}$

$= \frac{(x+2)(x(x-2)}{}$

Fatoração

- $3x^3 + 3x^2 - 6x = 3x(x^2 + x - 2) = 3x(x-1)(x+2)$
- $x^2 - 4 = (x^2 - 2^2) = (x^2 - 2 \cdot 2 \cdot x + 4)$
  $(x^2 - 4x + 4) = (x-2)(x+2)$
- $x^2 - 4x + 4 = 1(x-2)(x-2) = (x-2)^2$
- $x^2 - 2x = x(x-2)$

9-) $y = \frac{0,49 - x^2}{0,7 + x} = \frac{0,49 - (2)^2}{0,7 + 2} = \frac{0,49 - 4}{2,7} = -\frac{3,51}{2,7} = -1,3$

Pegue cada uma das alternativa e substitua por x

10- $\frac{ab}{b+c} = \frac{b^2 - bc}{a} \Rightarrow \frac{ab}{b+c} = \frac{b(b-c)}{a} \Rightarrow$

$\Rightarrow a^2 b = b(b-c).(b+c)$

$\Rightarrow a^2 = (b-c)(b+c)$

$\Rightarrow a^2 = b^2 - c^2 \Rightarrow b^2 = a^2 + c^2$

11-) $N = (2002^2 \cdot 2000) - (2000 \cdot 1998^2)$

$(4.008004 \cdot 2000) - (2000 \cdot 3992004)$

$(8016008000 - 7984008000)$

$32\,000\,000,00$

6x meya virgula

milhão mil centena

$32.000.000$

$10^6 = 1$ milhão

$32 \cdot 10^6 = 32\,000\,000$

Ensaio 1 - Porta AND (E)

a) Objetivo: Observar o da porta lógica 2 entradas.

Punta Druna

11

12-) $24y + 6xy - 15x - 60$
$10x - 40 - 4xy + 16y$

$\frac{3(2y-5)(x+4)}{2(5-2y)(x+4)}$

$\frac{3(2y-5)(x+4)}{2(-1)(-5+2)(x+4)} \div \frac{3(2y-5)(x+4)}{-2(2y-5)(x-4)}$

$\frac{3(x+4)}{2(x-4)}$

Fatorando
$= 24y + 6xy - 15x - 60$
$= 6y(4+x) - 15(x+4)$
$= (x+4)(6y-15) = 3(2y-5)(x+4)$ //

$= 10x - 40 - 4xy + 16y$
$= 10(x-4) + 4y(x-4)$
$= (x-4)(10+4y) =$
$= 2(5+2y)(x-4)$ //

13-) $\overbrace{(a+b)^3}^{x^3} + \overbrace{(a-b)^3}^{y^3}$

$x^3 + y^3 = (x+y)(x^2 - xy + y^2)$
$= [(a+b)+(a-b)][(a+b)^2 - (a+b)(a-b) + (a-b)^2]$
$= [2a][a^2 + 2ab + b^2 - (a^2 - b^2) + (a^2 - 2ab + b^2)]$
$= [2a][a^2 + 2ab + b^2 - a^2 + b^2 + a^2 - 2ab + b^2]$
$= [2a][3b^2 + a^2]$
$= 2a \cdot \frac{1}{a} = \frac{2a}{a} = 2$ //

14-) $(x^4 - y^4) + (2x^3y - 2xy^3)$
$(x^2)^2 - (y^2)^2 + 2xy(x^2 - y^2)$
$(x^2+y^2)(x^2-y^2) + 2xy[(x+y)(x+y)]$
$(x^2+y^2)(x-y)(x+y) + 2xy(x+y)(x-y)$
$(x^2+y^2+2xy) \cdot (x-y)(x+y)$
$(x+y)^2 \cdot (x-y)(x+y)$
$(x+y)^3 \cdot (x-y)$

Soma da diferença dos quadrados

15) $x^2 - y^2 = 40$

$(x+y)(x-y) = 40$

$(x+y) \cdot 2 = 40$

$(x+y) = \frac{40}{2}$

$x+y = 20$

Nº consecutivos
y ... x
x > y
1, 3, 5, 7 = 7 - 5 = 2
x - y = 2

olhando as alternativas quais numeros impares somado que é igual a 20 = 11 + 9 = 20 // alternativa (C)

16) $[10^2 + 20^2 + 30^2 \ldots 100^2] - [9^2 + 19^2 + 29^2 \ldots 99^2]$

$[10^2 + 20^2 + 30^2 \ldots 100^2] - [(10-1)^2 + (20-1)^2 (30-1)^2 \ldots (100-1)^2]$

// $- [(10^2 - 2.10 + 1^2) + (20^2 - 2.20.1 + 1) \ldots + (100^2 - 2.100 + 1^2)]$

$[10^2 + 20^2 + 30^2 \ldots + 100^2] - [(10^2 - 20 + 1) + (20^2 - 40 + 1) \ldots (100^2 - 200 + 1)]$

-19 -39 -199

$S_N = \frac{(19 + 199)) \cdot 10}{2} = \frac{2180}{2} = 1090$

$S_N =$

17) $(a^2b + ab^2) \left(\frac{\frac{1}{a^3} - \frac{1}{b^3}}{\frac{1}{a^2} - \frac{1}{b^2}} \right) \Rightarrow ab(a+b) \cdot \left(\frac{\frac{b^3 - a^3}{a^3b^3}}{\frac{b^2 - a^2}{a^2b^2}} \right)$

$\Rightarrow ab(a+b) \left(\frac{(b-a)(b^2 - ba + a^2)}{\frac{a^3b^3}{(b+a)(b-a)}} \right)$

$\Rightarrow ab(a+b) \cdot \frac{(b-a)(b^2 - ba + a^2)}{a^3b^3} \cdot \frac{a^2b^2}{(b+a)(b-a)}$

$\Rightarrow \frac{(b^2 - ba + a^2) \cdot a^3b^3}{a^3b^3} \Rightarrow (b^2 - ba + a^2)$ //

Paula Branca

18-) $(2x+y-z)^2 + (x-y)^2 + (z-3)^2 = 0$

$\sqrt{(2x+y-z)^2} = \sqrt{0} \Rightarrow$ $\begin{cases} 2x+y-z=0 \\ x-y=0 \\ z-3=0 \end{cases}$ $\begin{cases} 2.1+y=3 \\ 2+y=3 \\ y=3-2=1 \end{cases}$

$\sqrt{(x-y)^2} = \sqrt{0} \Rightarrow$

$\sqrt{(z-3)^2} = \sqrt{0} \Rightarrow$

$z-3=0$ $\begin{cases} 2x+y-3=0 \\ 2x+y=3 \end{cases}$ $\begin{cases} 2x+y=3 \\ x-y=0 \\ 3x=3 \Rightarrow x=\frac{3}{3}=1 \end{cases}$

$z=3$

$x+y+z$

$1+1+3=5$

19-) $(x^3-x) = x(x^3-1)$ R= 5 fatores

$= x(x^4-1)\ (x^4+1)$

$= x(x^2-1)(x^2+1)(x^4+1)$

$= \underbrace{x}_{1}\underbrace{(x-1)}_{2}\underbrace{(x+1)}_{3}\underbrace{(x^2+1)}_{4}\underbrace{(x^4+1)}_{5}$

20-) $x^2(1-y)^2 = y^2(1-x)^2 \quad x \neq y$ $x+y$ será 0

$x^2 = (1-y)^2 \Rightarrow x^2 = 1^2 - 2.1.y + y^2 \Rightarrow x^2 = 1 - 2y + y^2$

$y^2 = (1-x)^2 \Rightarrow y^2 = 1^2 - 2.1.x + x^2 \Rightarrow y^2 = 1 - 2x + x^2$

$\Rightarrow = x^2 - 2yx^2 + y^2x^2 \Rightarrow x^2 - 2yx^2 + y^2x^2 = y^2 - 2xy^2 + x^2y^2$

$\Rightarrow = y^2 - 2xy^2 + x^2y^2$

$\Rightarrow x^2 - y^2 = +2yx^2 - y^2x^2 - 2xy^2 + x^2y^2$

$\Rightarrow x^2 - y^2 = 2yx^2 - 2xy^2$

$\Rightarrow x^2 - y^2 = 2xy(x-y)$

$\Rightarrow (x+y)(x-y) = 2xy(x-y)$

$\Rightarrow (x+y) = 2xy$

Paula Drumm

21-) $[x^{\frac{1}{2}} - x^{\frac{1}{4}} + 1][x^{\frac{1}{2}} + x^{\frac{1}{4}} + 1]$

$[(x^{\frac{1}{2}} + 1) - (x^{\frac{1}{4}})][(x^{\frac{1}{2}} + 1) + (x^{\frac{1}{4}})]$

$(a - b)(a + b) = a^2 - b^2$

$(x^{\frac{1}{2}} + 1)^2 = x + 2 \cdot x^{\frac{1}{2}} \cdot 1 + 1^2 = x + 2x^{\frac{1}{2}} + 1$

$(x^{\frac{1}{4}})^2 = x^{\frac{1}{4}} \cdot x^{\frac{1}{4}} = x^{\frac{2}{4}} = x^{\frac{1}{2}}$

rascunho
$(x^{\frac{1}{2}})^2 = x^{\frac{2}{2}} = x$

$(x + 2x^{\frac{1}{2}} + 1) - (x^{\frac{1}{2}}) = \boxed{x + x^{\frac{1}{2}} + 1}$ //

$a^2 \quad - \quad b^2$

22-) $\frac{ax^2 - ay^2}{x^2 - 4xy + 3y}$ | Fatorando

$(a^2 - b^2)$

$\cdot ax^2 - ay^2 = (ax + ay)(ax - ay)$

$= a(x+y)\ a(x+y)$

$= a(x+y)(x-y)$ //

$\cdot x^2 - 4xy + 3y$

$(x - y)(x - 3y)$

$= \frac{a(x+y)(x-y)}{(x-y)(x-3y)}$

$= \frac{a(x+y)}{x-3y}$

a	c
1 | 1	3 | 3
0 |	1 | 1

23-) $\frac{3x^2 - 2x - 1}{2x^2 - 3x + 1}$ | Fatorando

$\cdot 3x^2 - 2x - 1$ (a, c)

$(x -)(x -)$

$(3x + 1)(x - 1)$

a	
3 | 3	
1 | (1,3) ou (3,1)	

c	
1 | 1	
(1,1)	

$\cdot 2x^2 - 3x + 1 =$

$(x - 1)(2x - 1)$

2 | 2	Δ
1 | (1,2) ou (2,1)	

c	
1 | 1	
(1,1)	

$= 2x^2 - x - 2x + 1$

$= 2x^2 - 3x + 1$ //

$\frac{3x+1}{2x-1}$ //

- Prof. Real

Ponta Branca