1)

271,6275 Decimal

10000111,10100000101... Binario

417,50121727 3146... Octal

10F,A0A3D70A3D7... Hexadecimal

426,65625 Decimal

110101010,10101 Binario

652,52 Octal

1AA,A8 Hexadecimal

235,21875 Decimal

11101011,00111 Binario

353,16 Octal

EB,38 Hexadecimal

61,70703125 Decimal

111101,10110101 Binario

75,552 Octal

3D,B5 Hexadecimal

2) $x_1 - x_2 + 3x_3 = 17$

$2x_1 - 2x_2 + x_3 = 9$

$-x_1 + x_2 - x_3 = -7$

$$\begin{array}{c} \begin{array}{cccc} x_1 & x_2 & x_3 & B \end{array} \\ \left|\begin{array}{cccc} 1 & -1 & 3 & 17 \\ 2 & -2 & 1 & 9 \\ -1 & 1 & -1 & -7 \end{array}\right| \end{array} \quad \begin{array}{l} \\ \\ m_2 = -2 \\ m_3 = 1 \end{array}$$

$$\begin{array}{c} \begin{array}{cccc} x_1 & x_2 & x_3 & B \end{array} \\ \left|\begin{array}{cccc} 1 & -1 & 3 & 17 \\ 0 & 0 & -5 & -25 \\ 0 & 0 & 2 & 10 \end{array}\right| \end{array} \qquad \begin{array}{c} \begin{array}{cccc} x_1 & x_3 & x_2 & B \end{array} \\ \left|\begin{array}{cccc} 1 & 3 & -1 & 17 \\ 0 & -5 & 0 & -25 \\ 0 & 2 & 0 & 10 \end{array}\right| \end{array} \quad \begin{array}{l} m_1 = 3/5 \\ \\ m_3 = 2/5 \end{array}$$

$$\begin{array}{c} \begin{array}{cccc} x_1 & x_3 & x_2 & B \end{array} \\ \left|\begin{array}{cccc} 1 & 0 & -1 & 2 \\ 0 & -5 & 0 & -25 \\ 0 & 0 & 0 & 0 \end{array}\right| \end{array} \qquad \begin{array}{c} \begin{array}{cccc} x_1 & x_3 & x_2 & B \end{array} \\ \left|\begin{array}{cccc} 1 & 0 & 0 & 2 \\ 0 & -5 & 0 & -25 \\ 0 & 0 & 0 & 0 \end{array}\right| \end{array}$$

$$\begin{array}{l} x_1 = 2 \\ -5x_3 = -25 \\ 0x_2 = 0 \end{array} \qquad \left[\begin{array}{l} x_1 = 2 \\ x_3 = 5 \\ x_2 = 0 \text{ (Variável livre)} \end{array}\right.$$

Resp. Sistema indeterminado

3) $2x_1 - x_2 + 4x_3 = 0$
$x_1 - x_2 + 2x_3 = -1$
$-x_1 + 4x_2 + 2x_3 = 3$

Metodo da pivotação Completa

$$\begin{array}{c|cccc|}
 & x_1 & x_2 & x_3 & B \\
 & 2 & -1 & 4 & 0 \\
 & 1 & -1 & 2 & -1 \\
1^\circ & -1 & 4 & 2 & 3
\end{array}$$

$m_1 = 1/4$
$m_2 = 1/4$

$$\begin{array}{|cccc|l}
x_1 & x_2 & x_3 & B & \\
7/4 & 0 & 18/4 & 3/4 & \cdot 4 \\
3/4 & 0 & 10/4 & -1/4 & \cdot 4
\end{array}$$

$$\begin{array}{c|cccc|}
 & x_1 & x_2 & x_3 & B \\
2^\circ & 7 & 0 & 18 & 3 \\
 & 3 & 0 & 10 & -1
\end{array}$$

$m_2 = -10/18$

$$\begin{array}{|cccc|l}
x_1 & x_2 & x_3 & B & \\
-16/18 & 0 & 0 & -48/18 & \cdot (-18)
\end{array}$$

$$\begin{array}{c|cccc|}
 & x_1 & x_2 & x_3 & B \\
3^\circ & 16 & 0 & 0 & 48
\end{array}$$

$$\begin{array}{cccc}
x_1 & x_2 & x_3 & B \\
\end{array}
\qquad\qquad
\begin{array}{cccc}
x_2 & x_3 & x_1 & B \\
\end{array}$$

$$\begin{vmatrix} -1 & 4 & 2 & 3 \\ 7 & 0 & 18 & 3 \\ 16 & 0 & 0 & 48 \end{vmatrix} = \begin{vmatrix} 4 & 2 & -1 & 3 \\ 0 & 18 & 7 & 3 \\ 0 & 0 & 16 & 48 \end{vmatrix}$$

$4x_2 + 2x_3 - x_1 = 3$
$18x_3 + 7x_1 = 3$
$16x_1 = 48$

Resp: $\boxed{\begin{array}{l} x_2 = 2 \\ x_3 = -1 \\ x_1 = 3 \end{array}}$

4) $6x_1 - x_2 - 2x_3 = 11$

$x_1 - 4x_2 + x_3 = -2$

$x_1 + 2x_2 + 4x_3 = 4$

$$x_1 = \frac{11 + x_2 + 2x_3}{6} \quad x_2 = \frac{2 + x_1 + x_3}{4} \quad x_3 = \frac{4 - x_1 - 2x_2}{4}$$

Jacobi

	x_1	x_2	x_3
0	0	0	0
1	1,83333	0,5	1
2	2,25	1,208325	0,291675
3	2,13194583	1,13541875	-0,1666625
4	1,967015625	0,9913208325	-0,1006958325

Gauss-Seidel

	x_1	x_2	x_3
0	0	0	0
1	1,83333	0,9583325	0,06250125
2	2,0138891667	1,0190976042	-0,0130210938
3	1,9988425694	0,9964553689	0,0020616732
4	2,0000964526	1,0005395315	-0,0002938789

Como: $6 \geq |-3|$

$|-4| \geq 2$ Criterio das linhas

$4 \geq 3$

$6 \geq 2$

$|-4| \geq 1$ Criterio das colunas

$4 \geq 3$

$$\det\begin{vmatrix} 6 & -1 & -2 \\ 1 & -4 & 1 \\ 1 & 2 & 4 \end{vmatrix}\begin{matrix} 6 & -1 \\ 1 & -4 \\ 1 & 2 \end{matrix} = -96 - 1 - 4 + 4 - 12 - 8 = -117$$

$$a_1 = \sqrt{6^2 + (-1)^2 + (-2)^2} = \sqrt{41}$$

$$a_2 = \sqrt{1^2 + (-4)^2 + 1^2} = \sqrt{18} = 3\sqrt{2}$$

$$a_3 = \sqrt{1^2 + 2^2 + 4^2} = \sqrt{21}$$

$$\det(\text{norm}\,A) = \frac{|-117|}{\sqrt{41}\cdot 3\sqrt{2}\cdot\sqrt{21}}$$

$$\det(\text{norm}\,A) = \frac{117}{3\sqrt{1722}}$$

$$\det(\text{norm}\,A) = \frac{39}{\sqrt{1722}}$$

$$\det(\text{norm}\,A) = \frac{39\sqrt{1722}}{1722}$$

$$\det(\text{norm}\,A) \simeq 0{,}9398272508$$

Resp: O Sistema Linear é bem condicionado

5) $x_1 + (2-i)x_2 = 8 - 2i$
$-x_1 + 3x_2 = 7 - i$

$M = \begin{vmatrix} 1 & 2 \\ -1 & 3 \end{vmatrix}$ $N = \begin{vmatrix} 0 & -1 \\ 0 & 0 \end{vmatrix}$ $c = \begin{vmatrix} 8 \\ 7 \end{vmatrix}$ $d = \begin{vmatrix} -2 \\ -1 \end{vmatrix}$

1º

$$\begin{array}{c} \begin{array}{ccccc} s_1 & s_2 & t_1 & t_2 & B \end{array} \\ \left|\begin{array}{ccccc} 1 & 2 & 0 & 1 & 8 \\ -1 & 3 & 0 & 0 & 7 \\ 0 & -1 & 1 & 2 & -2 \\ 0 & 0 & -1 & 3 & -1 \end{array}\right| \end{array} \begin{array}{l} \\ m_2 = 1 \\ m_3 = 0 \\ m_4 = 0 \end{array}$$

2º

$$\begin{array}{c} \begin{array}{ccccc} s_1 & s_2 & t_1 & t_2 & B \end{array} \\ \left|\begin{array}{ccccc} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & -1 & 1 & 2 & -2 \\ 0 & 0 & -1 & 3 & -1 \end{array}\right| \end{array} \begin{array}{l} \\ \\ m_3 = 1/5 \\ m_4 = 0 \end{array}$$

3º

$$\begin{array}{c} \begin{array}{ccccc} s_1 & s_2 & t_1 & t_2 & B \end{array} \\ \left|\begin{array}{ccccc} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & 0 & 1 & 11/5 & 1 \\ 0 & 0 & -1 & 3 & -1 \end{array}\right| \end{array} \begin{array}{l} \\ \\ \\ m_4 = 1 \end{array}$$

4º

$$\begin{array}{c} \begin{array}{ccccc} s_1 & s_2 & t_1 & t_2 & B \end{array} \\ \left|\begin{array}{ccccc} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & 0 & 1 & 11/5 & 1 \\ 0 & 0 & 0 & 26/5 & 0 \end{array}\right| \end{array}$$

multiplicando a 3º e 4º linha por 5 temos:

$$\begin{array}{c} \begin{array}{ccccc} s_1 & s_2 & t_1 & t_2 & B \end{array} \\ \left|\begin{array}{ccccc} 1 & 2 & 0 & 1 & 8 \\ 0 & 5 & 0 & 1 & 15 \\ 0 & 0 & 5 & 11 & 5 \\ 0 & 0 & 0 & 26 & 0 \end{array}\right| \end{array}$$

$s_1 + 2s_2 + 0t_1 + t_2 = 8$ $\quad s_1 = 2$
$5s_2 + 0t_1 + t_2 = 15$ $\quad s_2 = 3$
$5t_1 + 11t_2 = 5$ $\quad t_1 = 1$
$26t_2 = 0$ $\quad t_2 = 0$

Como $x_i = s_i + t_i i$ temos:

$$\boxed{\begin{array}{l} x_1 = 2 + i \\ x_2 = 3 \end{array}}$$

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

$f(3)$ pelo método de Briot-Ruffini:

	1	2	-5	-2	4
c=3	-	3	15	30	84
	1	5	10	28	f(3)=88

$\boxed{f(3) = 88}$

Colocar $f(x) = x^4 + 2x^3 - 5x^2 - 2x + 4$ na forma de Horner:

$$\boxed{f(x) = (((x+2)x-5)x-2)x+4}$$

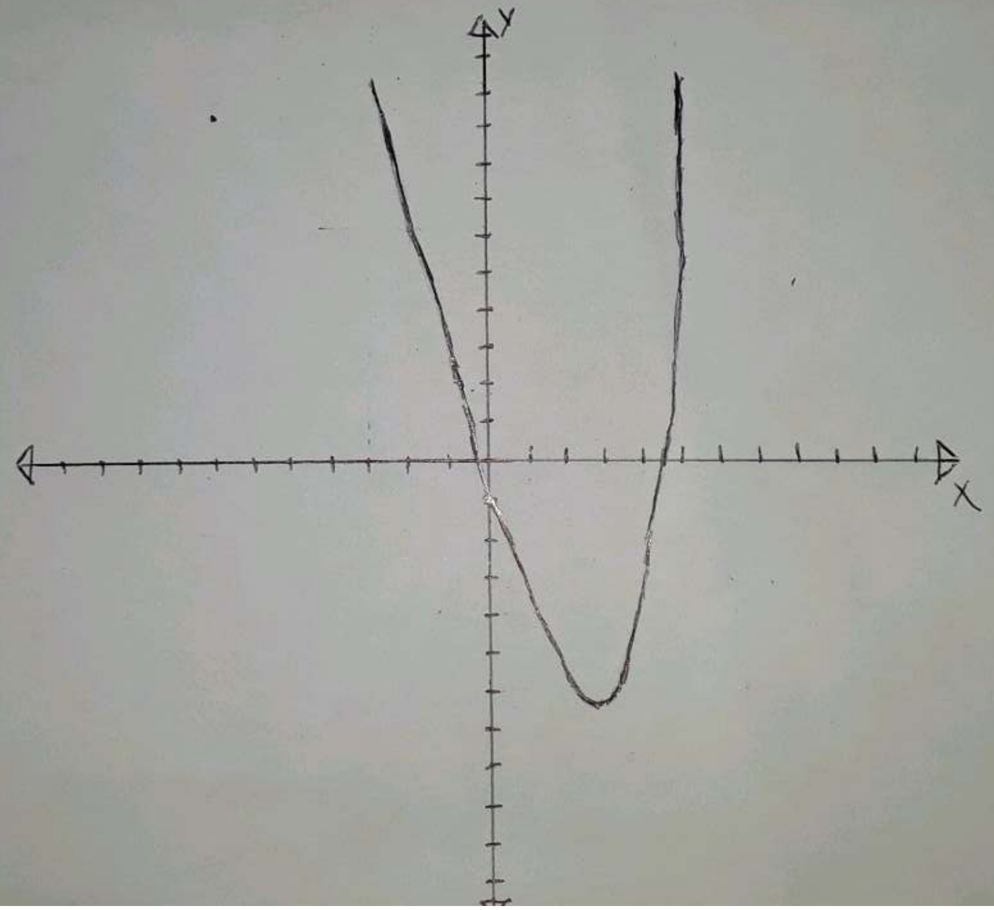
Calcular $f(2)$ pelo método de Horner:

$f(2) = (((2+2)\cdot 2-5)\cdot 2-2)\cdot 2+4$
$f(2) = ((4\cdot 2-5)\cdot 2-2)\cdot 2+4$
$f(2) = (3\cdot 2-2)\cdot 2+4$
$f(2) = 4\cdot 2+4$
$f(2) = 8+4$
$\boxed{f(2) = 12}$

7) $f(x) = 2^x - 4x - 2$

a	b	m	f(a)	f(b)	f(m)	erro máximo
-1	0	-0,5	2,5	-1	0,70711	0,5
-0,5	0	-0,25	0,70711	-1	-0,159101	0,25
-0,5	-0,25	-0,375	0,70711	-0,159101	0,271103	0,125
-0,375	-0,25	-0,3125	0,271103	-0,159101	0,05524	0,0625
-0,3125	-0,25	-0,28125	0,05524	-0,159101	-0,05212	0,03125

x	$f(x) = 2^x - 4x - 2$
-3	10,125
-2	6,25
-1	2,5
0	-1
1	-4
2	-6
3	-6
4	-2
5	10



8) $P(x) = x^4 + 2x^3 - 5x^2 - 4x - 6$

$n = 4$
$K = 2$
$B = 5$
$a_n = 1$

$$L = 1 + \sqrt[4-2]{\frac{5}{1}} = 1 + \sqrt{5} \simeq 3,23606$$

$P_1(x) = -6x^4 - 4x^3 - 5x^2 + 2x + 1 = 0$

Como $a_n < 0$ não podemos determinar o limite inferior das raízes positivas; então atribuímos zero como limite.

$$0 \leq x^+ \leq 3,23606$$

$P_2(x) = x^4 - 2x^3 - 5x^2 + 4x - 6$

$n = 4$
$K = 3$
$B = 5$
$a_n = 1$

$$L_2 = 1 + \sqrt[4-3]{\frac{5}{1}} = 6$$

$P_3(x) = -6x^4 + 4x^3 - 5x^2 - 2x + 1$

Como $a_n < 0$ não podemos determinar o limite superior das raízes negativas; então atribuímos zero como limite.

$$-6 \leq x^- \leq 0$$

i	xi	P(x)	P'(x)
0	3	72	128
1	2,4375	18,80763	65,20214
2	2,14799	3,44751	41,84537
3	2,06494	0,21156	36,15389
4	2,05908	0,00083	35,76849
5	2,05905	-0,00023	35,76653

$P(x) = x^4 + 2x^3 - 5x^2 - 4x - 6$

$P'(x) = 4x^3 + 6x^2 - 10x - 4$

nº de Variações de sinal: 1
nº de permanências de sinal: 3

$n^+ = 2$
$n^- = 1$

Pois uma de suas raízes tem multiplicidade

9) $\sqrt[3]{64}$ Metodo de Newton

$P(x) = x^3 - c$
$P'(x) = 3x^2$
$c = 64$

$$x_{i+1} = x_i - \frac{x_i^3 - c}{3x_i^2}$$
$$= x_i - \frac{x_i^3}{3x_i^2} + \frac{c}{3x_i^2}$$
$$= x_i - \frac{x_i}{3} + \frac{c}{3x_i^2}$$
$$= \frac{2}{3}x_i + \frac{c}{3x_i^2} = \frac{1}{3}\left(2x_i + \frac{c}{x_i^2}\right)$$

i	x_i
0	64
1	42,671875
2	28,45963
3	18,99942
4	12,72537
5	8,61532
6	6,03096
7	4,60716
8	4,07650
9	4,00142
10	4,00000
11	4