

Universidade Federal do Pampa
Campus de Caçapava do Sul
Programa de Bolsas de Iniciação à docência
Subprojeto Matemática

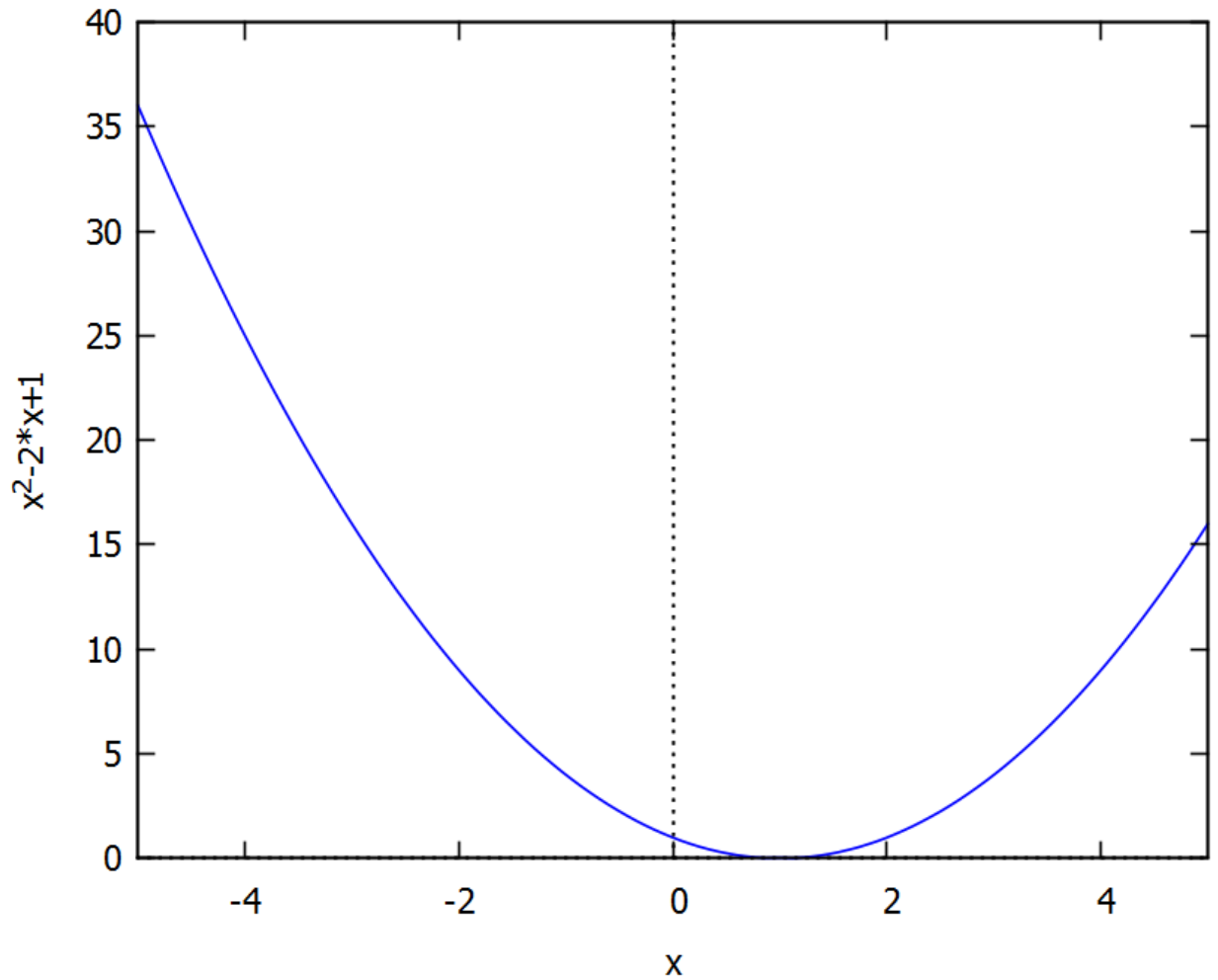
Nome: Misael Forma

Exercícios Wxmaxima.

1- Funções em geral, trigonometria, representação de gráficos, calculos diversos, produto, frações parciais e contínuas, etc.

1) Represente graficamente a função $f(x)=y=x^2-2*x+1$.

Gnuplot (window id : 0)



-3.32984, 17.0089

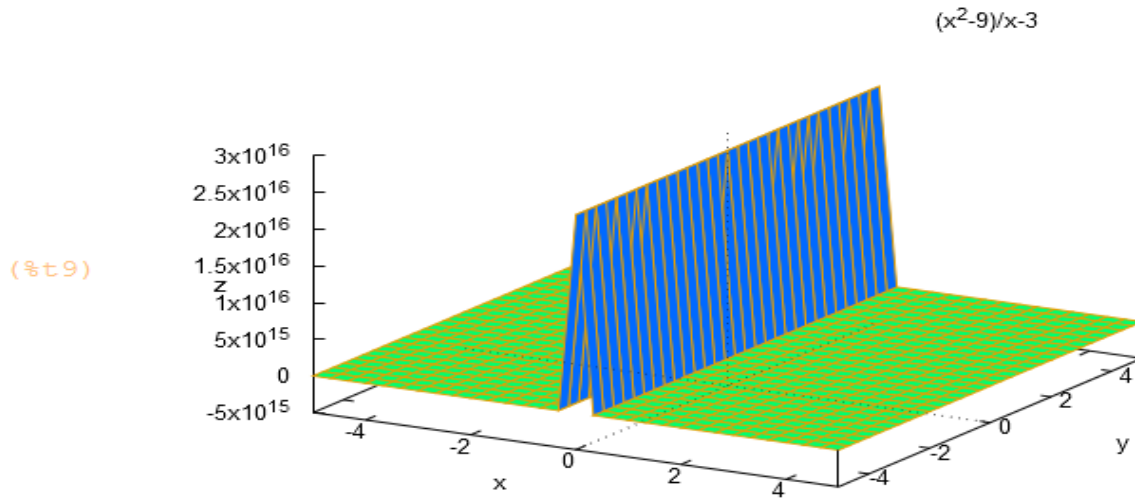


3) Calcule os limites laterais da função $f(x) = \frac{x^2 - 9}{x - 3}$ com x tendendo a 3. Qual é o limite desta função no ponto $x = 3$?

```
(%i7) limit((x^2-9)/x-3, x=3, 3);
limit: variable must be a symbol or subscripted symbol; found: x=3
-- an error. To debug this try: debugmode(true);
```

```
(%i8) limit((x^2-9)/x-3, 3, 3);
limit: second argument must be a variable, not a constant; found: 3
-- an error. To debug this try: debugmode(true);
```

```
(%i9) wxplot3d((x^2-9)/x-3, [x,-5,5], [y,-5,5])$
```



```
(%i13) limit((x^2-9)/x-3, x, 3);
```

Bem-vindo ao wxMaxima



Pesquisar na Web e no Windows



4) Seja a função $f(x)=y=x^3-3*x+4$, determine a sua derivada.

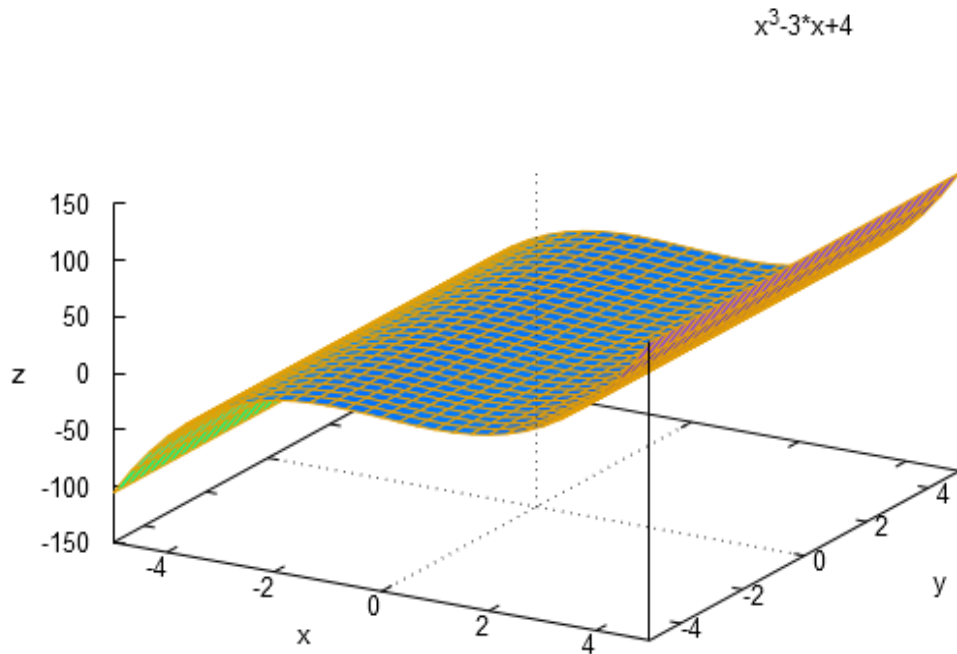
```
(%i13) limit((x^2-9)/x-3, x, 3);
(%o13) -3

(%i10) limit(x^2-9/x-3, x, 3);
(%o10) 3

(%i11) limit(x^2-9/x-3, 3, 3);
limit: second argument must be a variable, not a constant; found: 3
-- an error. To debug this try: debugmode(true);

(%i12) wxplot3d(x^3-3*x+4, [x,-5,5], [y,-5,5])$
```

(%t12)



Bem-vindo ao wxMaxima



5) Seja a função $f(x)=y=2*x-e^x$, determine a sua integral.

```

-->
(%i14) integrate(2*x-e^x, x);
(%o14) x^2 - \frac{e^x}{\log(e)}

(%i16) diff(x^3-3*x+4, x, 1);
(%o16) 3 x^2 - 3

-->

(%i17) A: matrix(
      [2,-1,0],
      [3,2,1],
      [2,-1,3]
    );
(A) \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}

-->

(%i19) determinant(%);
(%o19) 21

(%i20) A: matrix(
      [2,-1,0],
      [3,2,1],
      [2,-1,3]
    );

```

Bem-vindo ao wxMaxima



$$A = \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

Seja a matriz $A = \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}$, determine:
6) o determinante de A.

$$(A) \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

```
(%i21) invert(%);
```

$$(\%o21) \begin{bmatrix} \frac{1}{3} & \frac{1}{7} & -\frac{1}{21} \\ -\frac{1}{3} & \frac{2}{7} & -\frac{2}{21} \\ -\frac{1}{3} & 0 & \frac{1}{3} \end{bmatrix}$$

```
(%i22) A: matrix(
  [2,-1,0],
  [3,2,1],
  [2,-1,3]
);
```

$$(A) \begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

```
(%i23) eigenvalues(%);
```

$$(\%o23) \left[\left[-\frac{11 \left(\frac{\sqrt{3}i - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} - \frac{7}{54} \right)^{1/3}} + \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} - \frac{7}{54} \right)^{1/3} \left(-\frac{\sqrt{3}i - 1}{2} \right) + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} - \frac{7}{54} \right)^{1/3} \left(\frac{\sqrt{3}i - 1}{2} \right) - \frac{11 \left(-\frac{\sqrt{3}i - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} - \frac{7}{54} \right)^{1/3}} + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} - \frac{7}{54} \right)^{1/3} \right] - \frac{11}{9} + \frac{7}{3}, [1, 1, 1] \right]$$

Bem-vindo ao wxMaxima

Saving successful.



7) a matriz inversa de A, se existir.

(%o23)
$$\left[\left[-\frac{11 \left(\frac{\sqrt{3} \text{ %i} - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} \left(-\frac{\sqrt{3} \text{ %i} - 1}{2} \right) + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} \left(\frac{\sqrt{3} \text{ %i} - 1}{2} \right) - \frac{11 \left(-\frac{\sqrt{3} \text{ %i} - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} - \frac{11}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \frac{7}{3} \right], [1, 1, 1]]$$

```
(%i24) A: matrix(
    [2,-1,0],
    [3,2,1],
    [2,-1,3]
);
```

(A)
$$\begin{bmatrix} 2 & -1 & 0 \\ 3 & 2 & 1 \\ 2 & -1 & 3 \end{bmatrix}$$

```
(%i25) eigenvectors(%);
```

(%o25)
$$\left[\left[\left[-\frac{11 \left(\frac{\sqrt{3} \text{ %i} - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} \left(-\frac{\sqrt{3} \text{ %i} - 1}{2} \right) + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} \left(\frac{\sqrt{3} \text{ %i} - 1}{2} \right) - \frac{11 \left(-\frac{\sqrt{3} \text{ %i} - 1}{2} \right)}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \frac{7}{3}, \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} - \frac{11}{9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} + \frac{7}{3} \right], [1, 1, 1]], \left[\left[1, \frac{\left(3^{5/2} \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{2/3} + 11 \sqrt{3} \right) \text{ %i} + 9 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{2/3} - 6 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} - 11}{18 \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3}} \right], \left(\frac{\sqrt{199} - 7}{2 \cdot 3^{3/2}} \right)^{1/3} \right] \right]$$



8) os autovalores e autovetores da matriz A.

$$\frac{11}{9 \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3}} + \frac{7}{3} \left[\left(3^{5/2} \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{2/3} + 11\sqrt{3}\right) \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{2/3} - 6 \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3} - 11 \right] \cdot \frac{1}{18 \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3}}$$

$$\left(\left(3 \cdot 2^{4/3} \sqrt{199} - 19 \cdot 2^{7/3} \sqrt{3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{2/3} + \left(33 \cdot 2^{2/3} \sqrt{199} + 187 \cdot 2^{2/3} \sqrt{3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{1/3} \right) \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{2/3} + \left(19 \cdot 2^{7/3} - 2^{4/3} \sqrt{3} \sqrt{199}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{2/3} + \left(11 \cdot 2^{2/3} \sqrt{3} \sqrt{199} + 187 \cdot 2^{2/3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{1/3} - 1936 \right) / 2904 \left[\left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3} \right] \cdot \frac{1}{18 \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3}}$$

$$- \left(\left(3 \cdot 2^{4/3} \sqrt{199} - 19 \cdot 2^{7/3} \sqrt{3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{2/3} + \left(33 \cdot 2^{2/3} \sqrt{199} + 187 \cdot 2^{2/3} \sqrt{3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{1/3} \right) \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{2/3} + \left(2^{4/3} \sqrt{3} \sqrt{199} - 19 \cdot 2^{7/3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{2/3} + \left(-11 \cdot 2^{2/3} \sqrt{3} \sqrt{199} - 187 \cdot 2^{2/3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{1/3} + 1936 \right) / 2904 \left[\left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3} \right] \cdot \frac{1}{9 \left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3}}$$

$$\frac{\left(2^{4/3} \sqrt{3} \sqrt{199} - 19 \cdot 2^{7/3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{2/3} + \left(-11 \cdot 2^{2/3} \sqrt{3} \sqrt{199} - 187 \cdot 2^{2/3}\right) \left(3^{3/2} \sqrt{199} - 7\right)^{1/3} - 968}{1452} \left[\left(\frac{\sqrt{199}}{2 \cdot 3^{3/2}} - \frac{7}{54}\right)^{1/3} \right]$$

-->

