Tarefa 1

Equações algébricas com Maple (solve, fsolve)

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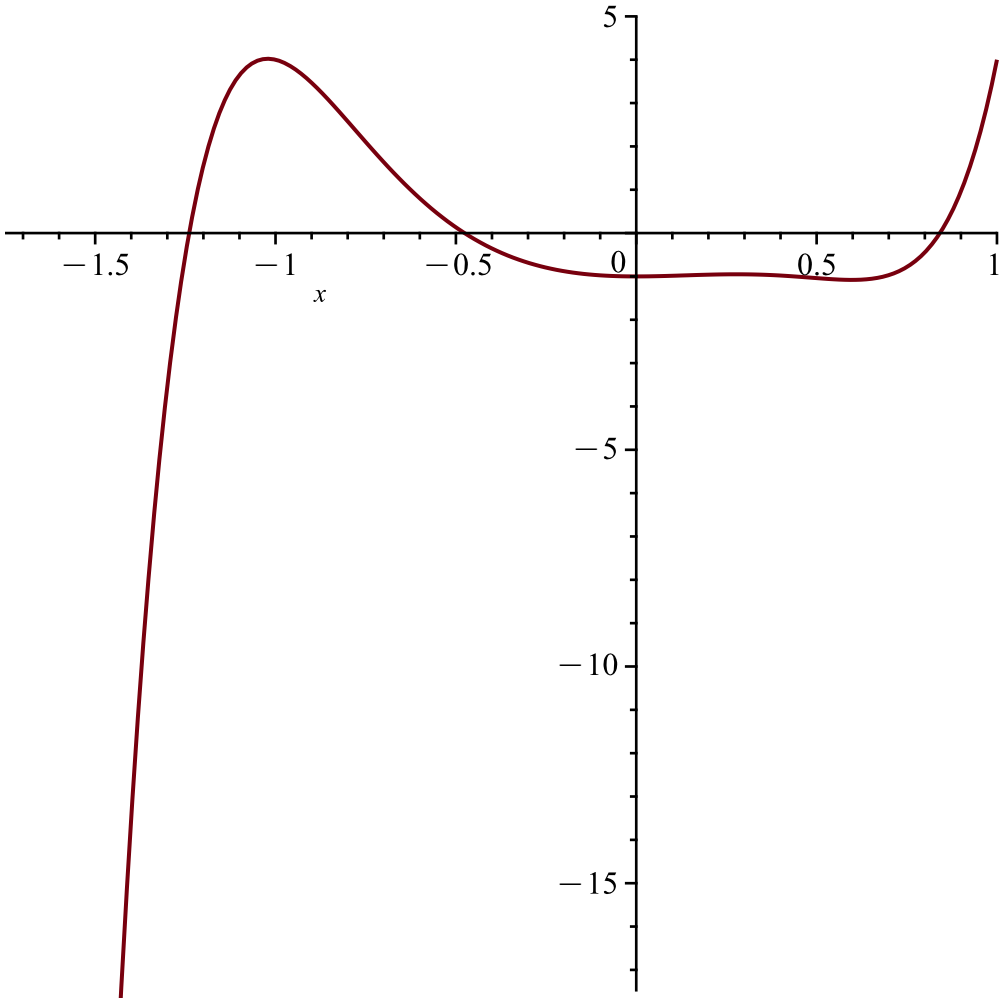
Questão 1.

```
restart :
eq1 := x -> 5*x^7 + 3*x^6 - 5*x^3 + 2*x^2 - 1;
```

$$eq1 := x \mapsto 5 \cdot x^7 + 3 \cdot x^6 - 5 \cdot x^3 + 2 \cdot x^2 - 1 \quad \textbf{(1)}$$

```
plot(eq1(x), x = -2 .. 1);
```




```
r1 := fsolve(eq1(x) = 0, x = -2 .. -1);
```

$$r1 := -1.239474191 \quad \textbf{(2)}$$

```
r2 := fsolve(eq1(x) = 0, x = -1 .. 0);
```

$$r2 := -0.4760722430 \quad \textbf{(3)}$$

```
r3 := fsolve(eq1(x) = 0, x = 0 .. 1);
```

$$r3 := 0.8418089302 \quad \textbf{(4)}$$

Achando os extremos relativos:

$df := diff(eq1(x), x);$

$$df := 35\,x^6 + 18\,x^5 - 15\,x^2 + 4\,x \quad \textbf{(5)}$$

$d2f := diff(df, x);$

$$d2f := 210\,x^5 + 90\,x^4 - 30\,x + 4 \quad \textbf{(6)}$$

$pc := fsolve(df, x);$

$$pc := -1.021432567,\ 0.,\ 0.2776476561,\ 0.5976308402 \quad \textbf{(7)}$$

$eval\_d2f\_1 := subs(x = -1.021432567, d2f);$ *#máximo relativo (segunda derivada<0)*

$$eval\_d2f\_1 := -100.8794220 \quad \textbf{(8)}$$

$eval\_d2f\_2 := subs(x = 0., d2f);$ *#mínimo relativo (segunda derivada>0)*

$$eval\_d2f\_2 := 4. \quad \textbf{(9)}$$

$eval\_d2f\_3 := subs(x = 0.2776476561, d2f);$ *#máximo relativo (segunda derivada<0)*

$$eval\_d2f\_3 := -3.448107319 \quad \textbf{(10)}$$

$eval\_d2f\_4 := subs(x = 0.5976308402, d2f);$ *#mínimo relativo (segunda derivada>0)*

$$eval\_d2f\_4 := 13.56167793 \quad \textbf{(11)}$$

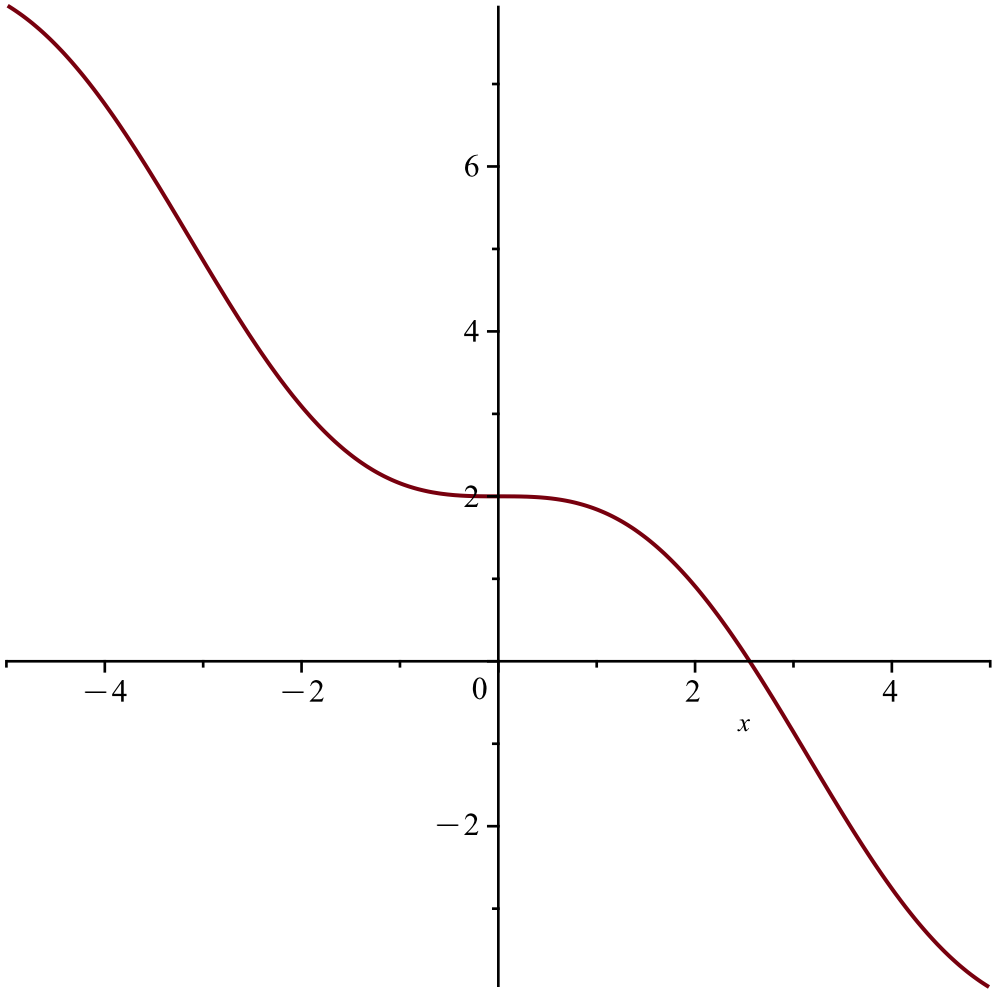
Questão 2.

restart :

$eq2 := x \rightarrow \sin(x) - x + 2;$

$$eq2 := x \mapsto \sin(x) - x + 2 \quad \textbf{(12)}$$

$plot(eq2(x), x = -5 .. 5);$



$R := fsolve(eq2(x) = 0, x = 2..3);$

$$R := 2.554195953 \quad \textbf{(13)}$$

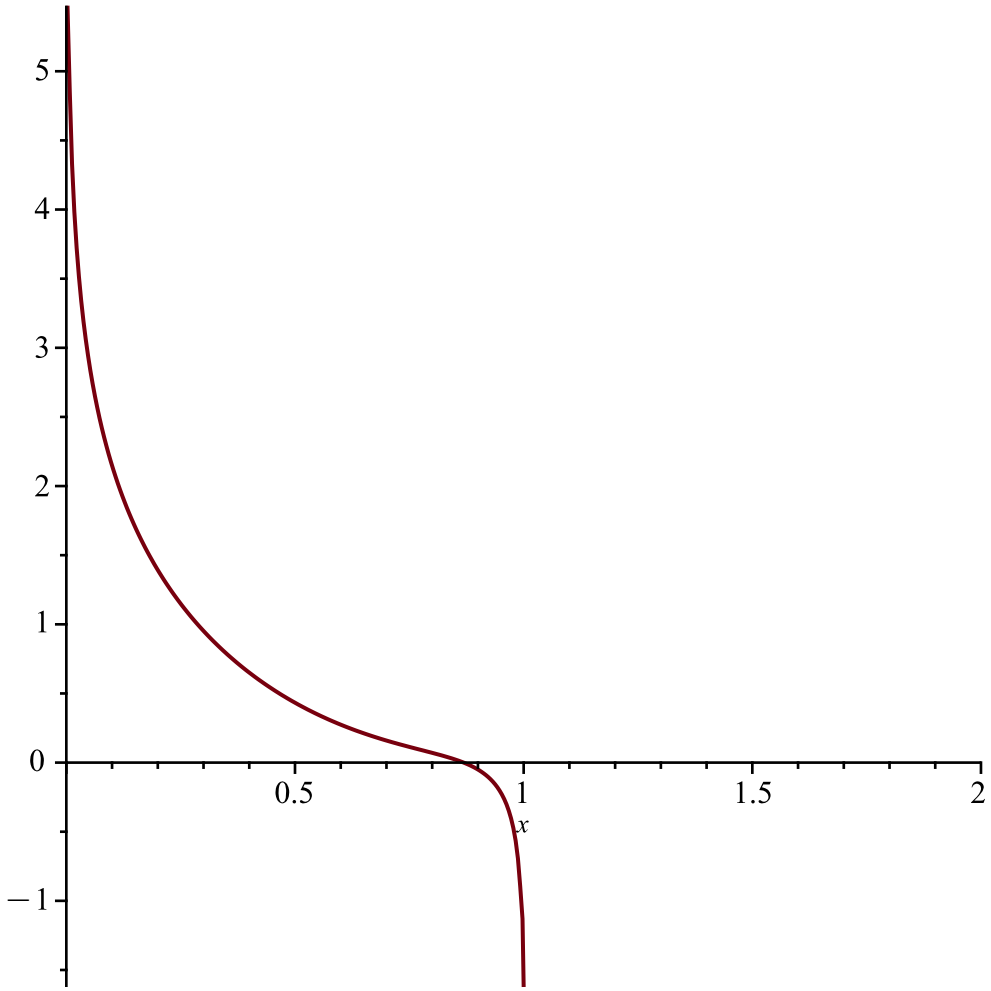
Questão 3.

restart;

$eq3 := x \rightarrow x * \tan(x) - \ln(x) + \log10(1 - \mathrm{sqrt}(x));$

$$eq3 := x \mapsto x \cdot \tan(x) - \ln(x) + \log10\left(1 - \sqrt{x}\right) \quad \textbf{(14)}$$

$plot(eq3(x), x = 0 .. 2);$



$R := fsolve(eq3(x) = 0, x = 0..1);$

$$R := 0.8686891769 \quad \textbf{(15)}$$

***Questão* 4.**

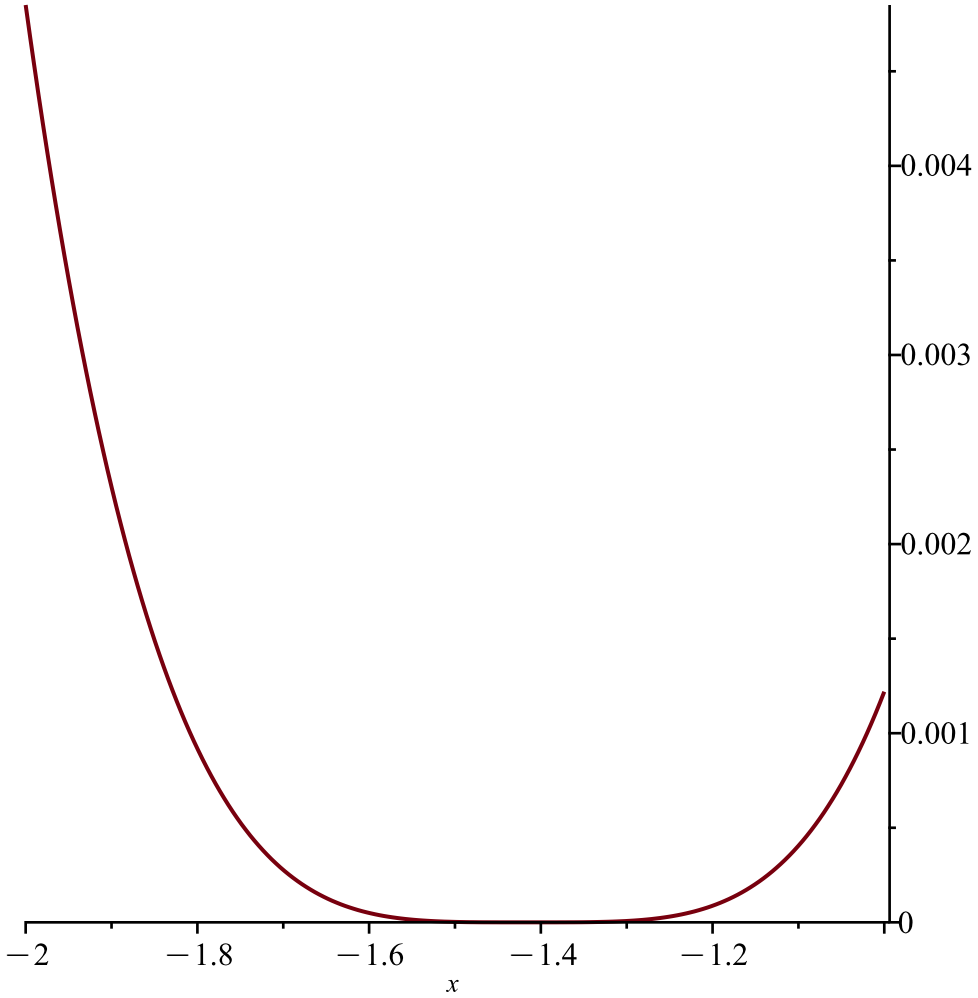
$$4. \quad \textbf{(16)}$$

$restart:$

$eq4 := x \to \cos(x + \mathrm{sqrt}(2)) + x \cdot \left(\frac{x}{2} + \mathrm{sqrt}(2)\right);$

$$eq4 := x \mapsto \cos\left(x + \sqrt{2}\right) + x \cdot \left(\frac{x}{2} + \sqrt{2}\right) \quad \textbf{(17)}$$

$plot(eq4(x), x = -2 .. -1);$



$R := fsolve(eq4(x) = 0, x = -2..0);$

$$R := -1.414213481 \quad \textbf{(18)}$$

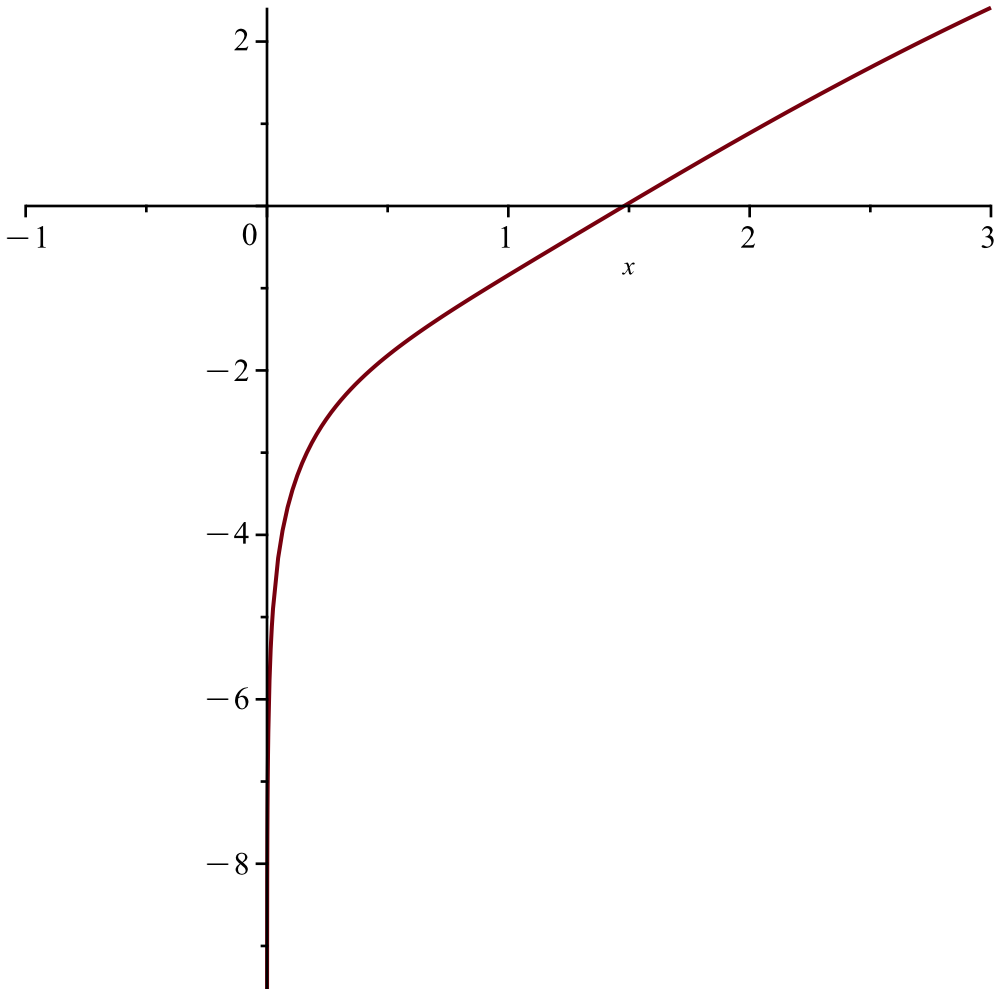
Questão 5.

restart;

$eq5 := x \rightarrow int\left(\frac{\exp(\sin(t))}{t}, t = 1..x\right) - \sin(x);$

$$eq5 := x \mapsto \int_1^x \frac{e^{\sin(t)}}{t}\, dt - \sin(x) \quad \textbf{(19)}$$

$plot(eq5(x), x = -1..3);$



$R := fsolve(eq5(x) = 0, x = 1..2);$

$R := 1.479775745$ **(20)**