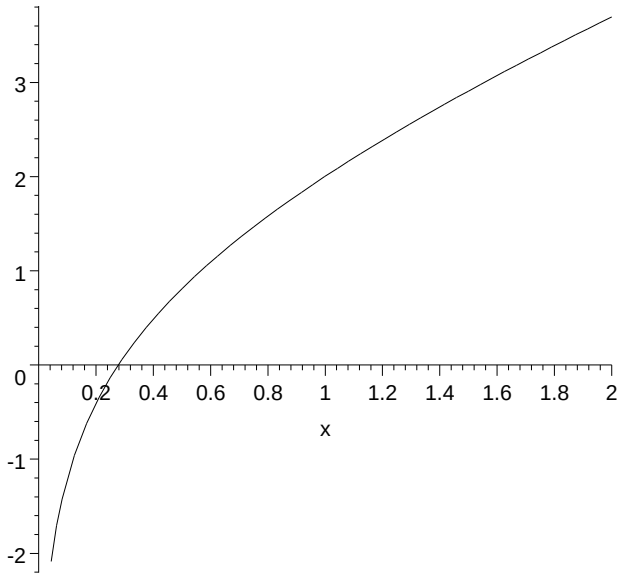
EXERCICE 1

Exercice 1:

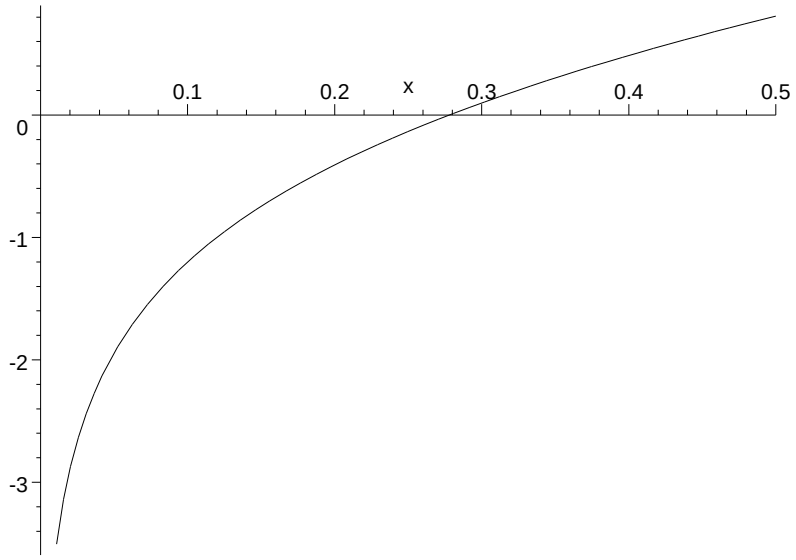
```
> g:=x+1+ln(x);
```

$$g := \ln(x) + x + 1$$

```
> plot(g,x=0..2,color=black);
```




```
> plot(g,x=0..0.5,color=black);
```




```
> f:=4*x*ln(x)/(x+1);
```

$$f := 4\,\frac{x\ln(x)}{x+1}$$

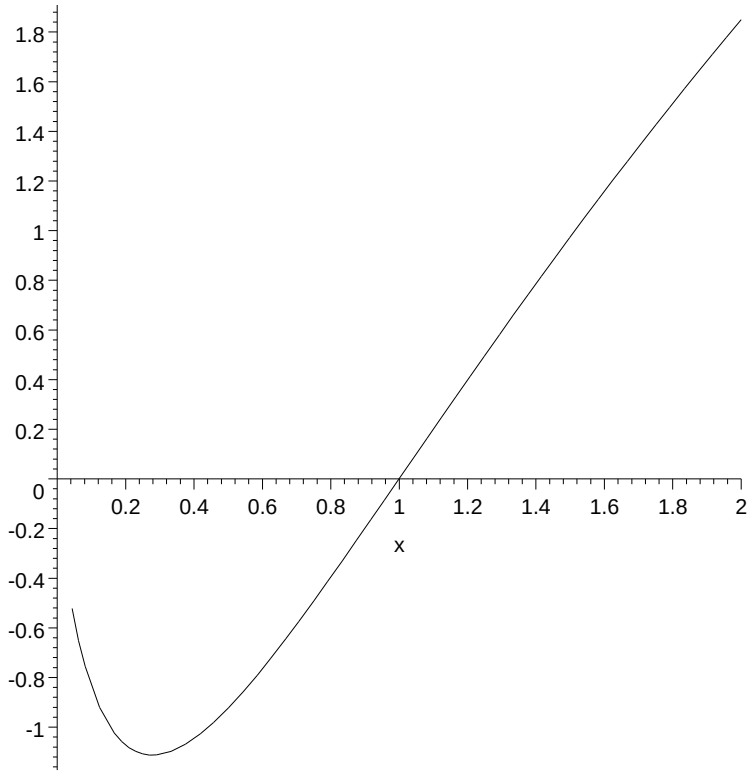
```
> h:=diff(f,x);
```

$$h := 4\,\frac{\ln(x)}{x+1} + 4\,\frac{1}{x+1} - 4\,\frac{x\ln(x)}{(x+1)^2}$$

```
> h:=simplify(h);
```

$$h := 4\,\frac{\ln(x)+x+1}{(x+1)^2}$$

```
> plot(f,x=0..2,color=black);
```



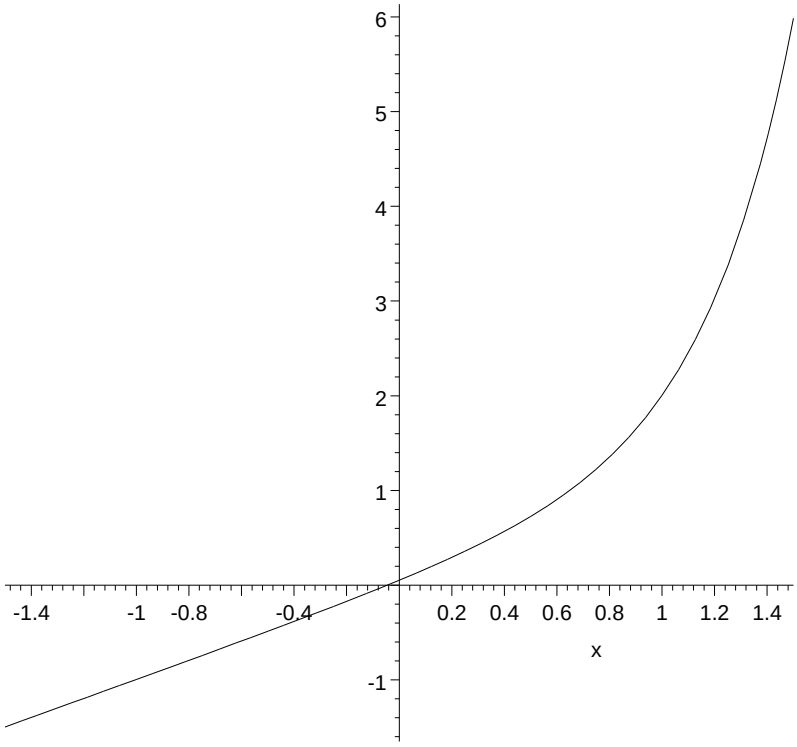
EXERCICE 2

a)

```
> f:=x+exp(3*x-3);
```

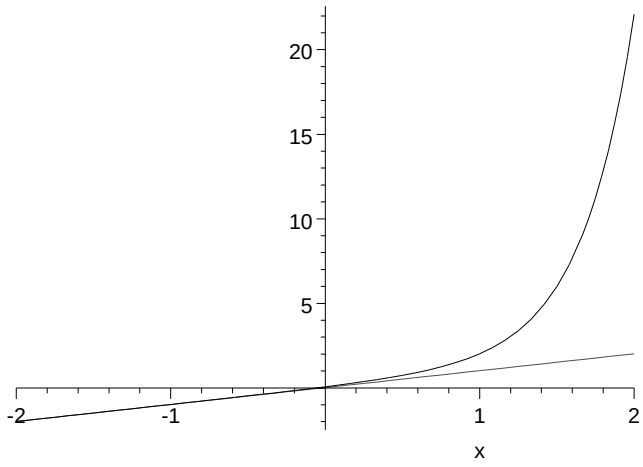
$$f := x + \mathbf{e}^{(3x-3)}$$

```
> plot([f],x=-1.5..1.5,color=black);
>
```



Asymptote en - ∞

```
> plot([f,x],x=-2..2,color=[black,red]);
>
```

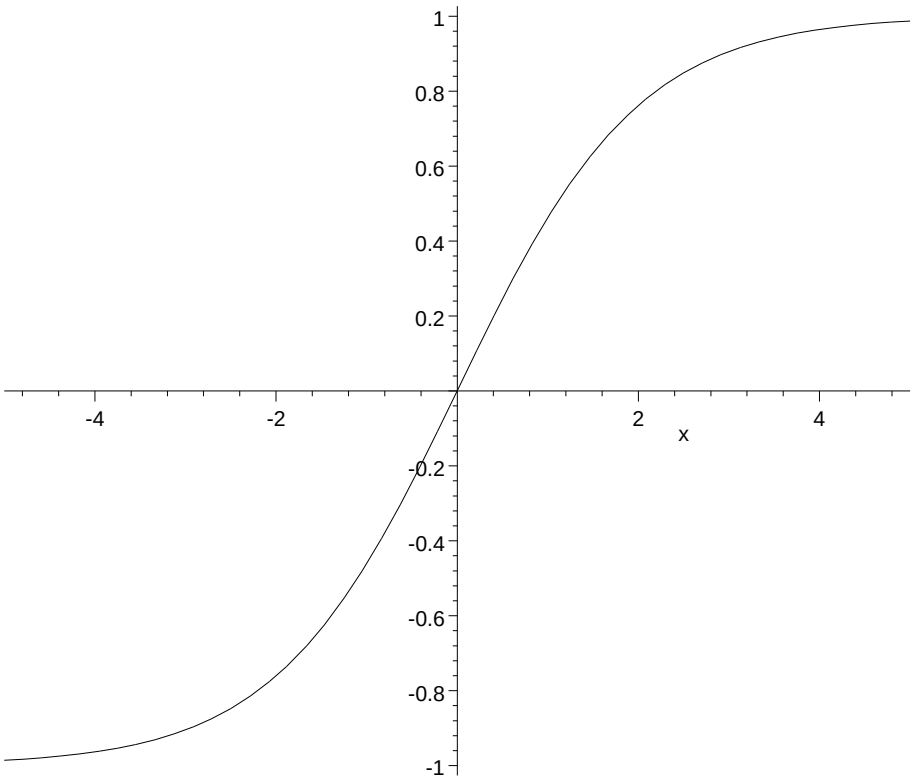


b)

```
> f:=(exp(x)-1)/(exp(x)+1);
```

$$f := \frac{\mathbf{e}^x - 1}{\mathbf{e}^x + 1}$$

```
> plot(f,x=-5..5,color=black);
```

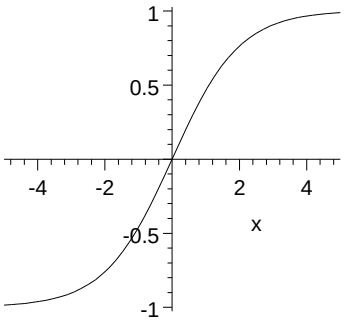


C’est une fonction de trigonometrie hyperbolique.

```
> g:=tanh(x/2);
>
```

$$g := \tanh\left(\frac{1}{2}x\right)$$

```
> plot(g,x=-5..5,color=black);
```



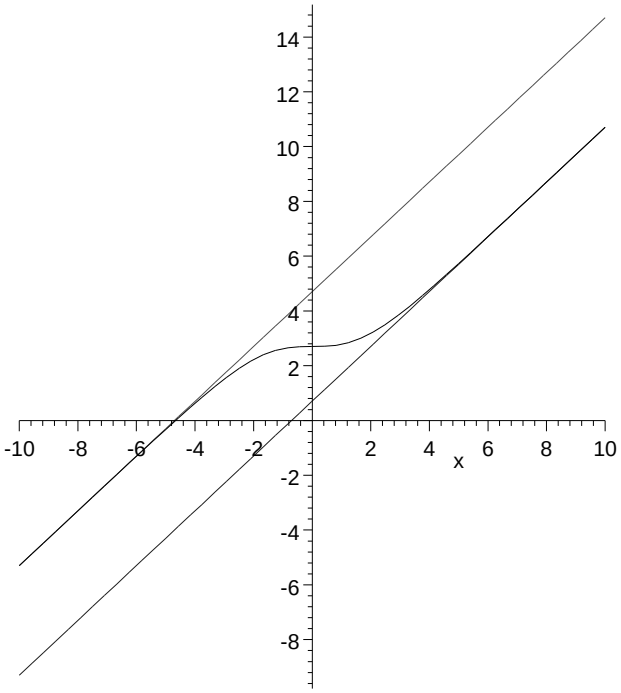
c)

```
> f:=x+ln(2)+4/(exp(x)+1);
```

$$f := x + \ln(2) + 4\,\frac{1}{\mathbf{e}^{x} + 1}$$

f et ses asymptotes en - ∞et + ∞

```
> plot([f,x+ln(2),x+ln(2)+4],x=-10..10,color=[black,blue,red]);
```



Recherche d'un point d'inflexion.

```
> g:=diff(f,x);
```

$$g := 1 - 4\,\frac{\mathbf{e}^{x}}{(\mathbf{e}^{x} + 1)^{2}}$$

```
> simplify(subs(x=0,g));
```

$$0$$

```
> h:=diff(g,x);
```

$$h := 8\,\frac{(\mathbf{e}^{x})^{2}}{(\mathbf{e}^{x}+1)^{3}} - 4\,\frac{\mathbf{e}^{x}}{(\mathbf{e}^{x}+1)^{2}}$$

```
> simplify(subs(x=0,h));
```

$$0$$

```
> k:=diff(h,x);
```

$$k := -24\,\frac{(\mathbf{e}^{x})^{3}}{(\mathbf{e}^{x}+1)^{4}} + 24\,\frac{(\mathbf{e}^{x})^{2}}{(\mathbf{e}^{x}+1)^{3}} - 4\,\frac{\mathbf{e}^{x}}{(\mathbf{e}^{x}+1)^{2}}$$

```
> simplify(subs(x=0,k));
```

$$\frac{1}{2}$$

```
>
```