Résoudre les équations suivantes

1) $\ln^2 x - \ln x - 2 = 0$ $\{ \frac{1}{e} , e^2 \}$

2) $\ln^4 x - 3\ln^2 x + 2 = 0$ $\{ e , \frac{1}{e} , e^{\sqrt{2}} , \frac{1}{e^{\sqrt{2}}} \}$

3) $\ln(2x-3) + \ln(x-4) = 2\ln 5$ $\{ \frac{13}{2} \}$

4) $\ln(2x-3) - \ln(x-4) = 2\ln 5$ $\{ \frac{97}{13} \}$

5) $2\ln(x-3) + \ln(x-1) = \ln(2x-2)$ $\{ 3 + \sqrt{2} \}$

6) $20\ln^2 x - 16\ln x + 3 = 0$ $\{ \sqrt{e} , \sqrt[10]{e^{13}} \}$

7) $4^x - 2^{x+3} = 128$ $\{ 4 \}$

8) $3^x + 3^{3-x} = 12$ $\{ 1 , 2 \}$

9) $\log_x \sqrt{2} = 3$ $\{ \sqrt[6]{2} \}$

10) $\log_6 x + \log_x 6 = \frac{13}{6}$ $\{ 6\sqrt{6} , \sqrt[3]{36} \}$

11) $2\log_4(x+1) + \log_4(x+3) = \frac{1}{2} + \log_4(6x+2)$ $\{ 1 , -3 + 2\sqrt{2} \}$

12) $\log_2(x-1) = \log_4 3$ $\{ 1 + \sqrt{3} \}$

13) $\log_7(3x-1) = \frac{-1}{2}$ $\{ \frac{1+\sqrt{7}}{3} \}$

14) $\log_3(\log_4 x) = -1$ $\{ \sqrt[3]{4} \}$

15) $\log_2(\log_x 81) = 2$ $\{ 3 \}$

16) $e^x - 4e^{-x} - 3 = 0$ $\{2\ln 2\}$

17) $\log_{x-1} 5x = 2$ $\{ \frac{7+3\sqrt{5}}{2} \}$

18) $10^{2x} - 10^x = 5$ $\{ \log\frac{1+\sqrt{21}}{2} \}$

19) $81^x + 81^{1-x} = 30$ $\{ \frac{1}{4} , \frac{3}{4} \}$

20) $\log_x(x+1) - \log_x 0{,}2 = 2$ $\{ \frac{5+3\sqrt{5}}{2} \}$

Résoudre les inéquations suivantes

1) $\log_{\frac{1}{3}} \frac{1-x^2}{x} < \log_3 x$

2) $4 - \ln^2 x \leq 0$ $\quad]0\,,\,\frac{1}{e^2}] \quad [e^2, \rightarrow$

3) $\ln x - \ln 2 \leq \ln(1-3x)$ $\quad]0\,,\,\frac{2}{7}]$

4) $\frac{\ln x + 1}{1 - \ln x} \leq 0$ $\quad]0\,,\,\frac{1}{e}] \quad]e\,,\,\rightarrow$

5) $2\ln^2 x - \ln x - 1 \geq 0$ $\quad]0\,,\,\frac{1}{\sqrt{e}}] \quad [e\,,\,\rightarrow$

6) $e^x + 2e^{-x} - 3 > 0$ $\quad \leftarrow, 0[\quad]\ln 2\,,\,\rightarrow$

7) $e^{2x-1} + \frac{1}{e} > 0$ $\quad$ R

8) $\left(\frac{1}{5}\right)^x \leq 5^{2x-1}$ $\quad [\,\frac{1}{3}\,,\,\rightarrow$

9) $\ln \frac{x-1}{x+1} + \ln x < 0$ $\quad]1\,,\,1+\sqrt{2}\,[$

10) $\ln(e^x + 2) \geq \ln(4 - e^x)$ $\quad [0\,,\,2\ln 2[$

Dériver

1) $(e^x)^3$ $\quad 3e^{3x}$

2) $x^2 e^{(x-1}$ $\quad e^{x-1}(x^2 + 2x)$

3) $\frac{x}{e^x}$ $\quad \frac{1-x}{e^x}$

4) $e^{Arctg.}$ $\quad \frac{e^{Arctg\ x}}{1+x^2}$

5) $\cos 3e^x$ $\quad -3e^x \sin 3e^x$

6) $\sqrt{e^{\sin x}}$ $\quad \frac{\cos x \sqrt{e^{\sin x}}}{2}$

7) $\frac{e^x}{\ln x}$ $\quad \frac{e^x(x\ln x - 1)}{\ln^2 x}$

8) $\ln(\sin x)$ $\quad cotg\ x$

9) $\ln^2(3-e^{2x})$ $\dfrac{-4\,e^{2x}\ln(3-e^{2x})}{3-e^{2x}}$

10) $\ln\dfrac{(x-1)^3}{x+1}$ $\dfrac{3}{x-1}-\dfrac{1}{x+1}=\dfrac{2x+4}{x^2-1}$

11) $3^{tg\,x}$ $\dfrac{\ln 3\ .\ 3^{tg\,x}}{\sin^2 x}$

12) $\dfrac{2^x+3^x}{5^x}$ $\dfrac{2^x\ln\frac{2}{5}+3^x\ln\frac{3}{5}}{5^x}$

13) $(\frac{1}{2})^{Arc\cos x}$ $\dfrac{\ln 2\ (\frac{1}{2})^{Arc\cos x}}{\sqrt{1-x^2}}$

14) $2^{\sin 3x}$ $3\ln 2\ 2^{\sin 3x}\cos 3x$

15) $x\ Arc\sin(\dfrac{\ln x}{x})$ $Arc\sin\ \dfrac{\ln x}{x}+\dfrac{1-\ln x}{\sqrt{x^2-\ln^2 x}}$

16) $10^{\ln x}$ $\dfrac{10^{\ln x}.\ln 10}{x}$

17) $\sqrt{\log(e^x)}$ $\dfrac{1}{2\sqrt{x}.\ln 10}$

18) $2^{\sqrt{e^x}}$ $\dfrac{\ln 2\ .\sqrt{e^x}\ .\ 2^{\sqrt{e^x}}}{2}$

19) $\dfrac{e^x+e^{-x}}{2}$ $\dfrac{e^x-e^{-x}}{2}$

20) $\dfrac{e^x-e^{-x}}{2}$ $\dfrac{e^x+e^{-x}}{2}$

Calculer les limites suivantes

1) $\lim\limits_{x\to+\infty}\dfrac{\log(x-2)}{x^2}$ 0

2) $\lim\limits_{x\to+\infty}\dfrac{x^2}{e^{-x}}$ $+\infty$

3) $\lim\limits_{x\to+\infty} x\log\frac{1}{2}x$ $-\infty$

4) $\lim\limits_{x\to 1}(x^2-1)\ \log_{\frac{2}{3}}(x-1)$ 0

5) $\lim\limits_{x\to 0}\dfrac{\ln(1+x)-\ln(1-x)}{x}$ 2

6) $\lim\limits_{x \to 0} \dfrac{x \log_2(1+x)}{tg^2 x}$ $\dfrac{1}{\ln 2}$

7) $\lim\limits_{x \to 0} \dfrac{\ln(1+x^2)}{\sin^2 3x}$ $\dfrac{1}{9}$

8) $\lim\limits_{x \to +\infty} \dfrac{e^x}{x^5}$ $+\infty$

9) $\lim\limits_{x \to \pm\infty} (1+\dfrac{a}{x})^x$ e^a

10) $\lim\limits_{x \to \pm\infty} (\dfrac{1+x}{x-1})^x$ e^2

11) $\lim\limits_{x \to 0} \dfrac{e^x \sin x - x}{3x^2 + x^5}$ $\dfrac{1}{3}$

12) $\lim\limits_{x \to 0} \dfrac{a^x - 1}{x}$ $\ln a$

13) $\lim\limits_{x \to 0} \left(cotg\, x\right)^{\frac{1}{\ln x}}$ $\dfrac{1}{e}$

14) $\lim\limits_{x \to +\infty} x^{\frac{1}{x}}$ 1

15) $\lim\limits_{x \to +\infty} \left(1+\dfrac{1}{x}\right)^{4x-1}$ e^4

16) $\lim\limits_{x \to +\infty} \left(1+\dfrac{2}{x}\right)^{-x+2}$ $\dfrac{1}{e}$

17) $\lim\limits_{x \to +\infty} \left(\dfrac{x+2}{x-3}\right)^{3x-1}$ e^{15}

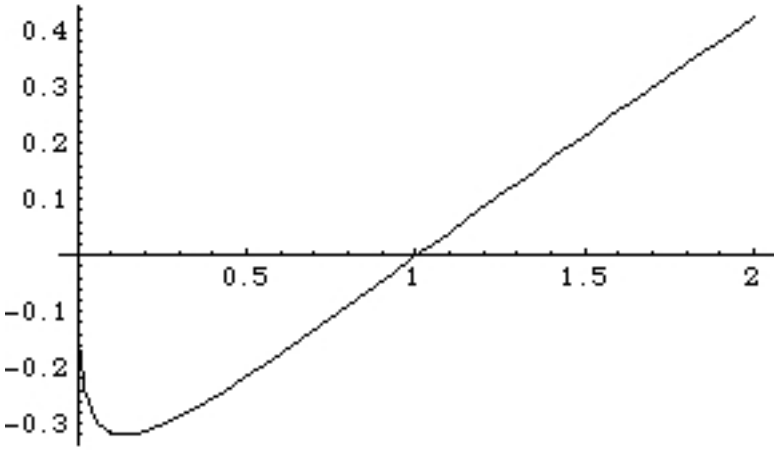
18) $\lim\limits_{x \to 0} \left(1-3x\right)^{\frac{-2}{x}}$ e^6

19) $\lim\limits_{x \to 0} \left(1+\sin x\right)^{\frac{1}{\sin x}}$ e

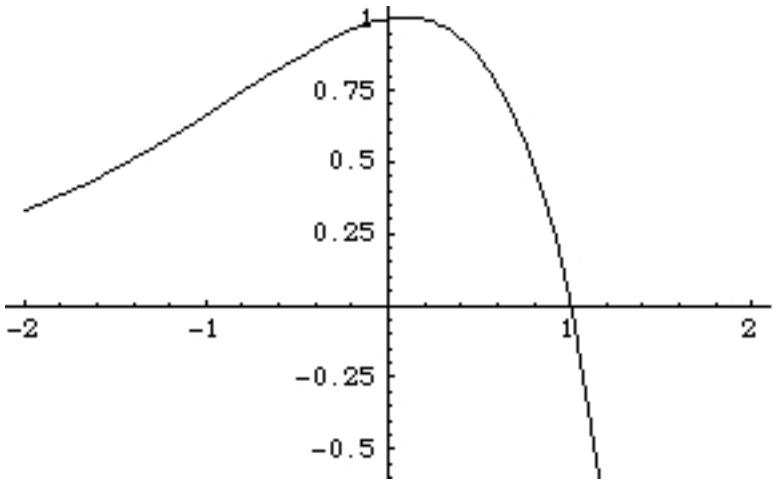
20) $\lim\limits_{x \to 1} x^{\frac{1}{x-1}}$ e

Etudier les fonctions suivantes

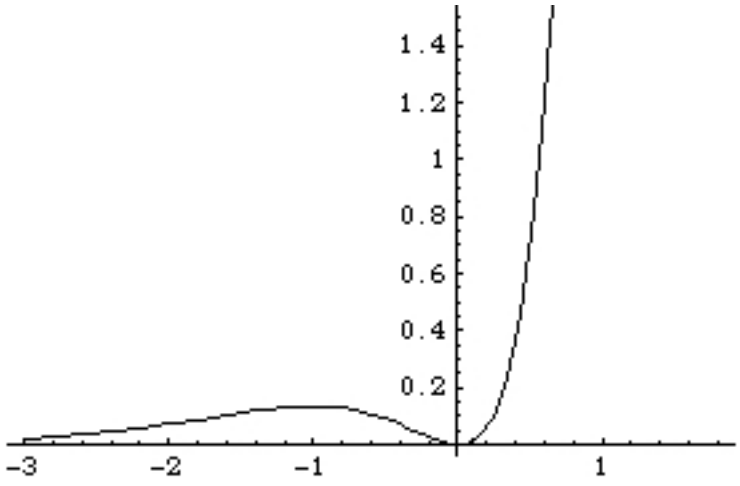
1) $f(x) = \sqrt{x} \log x$



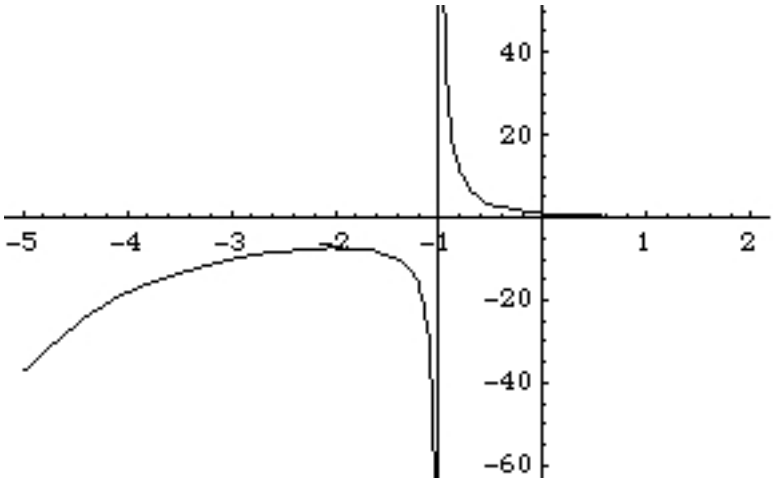
2) $f(x) = 3^x (1 - x)$



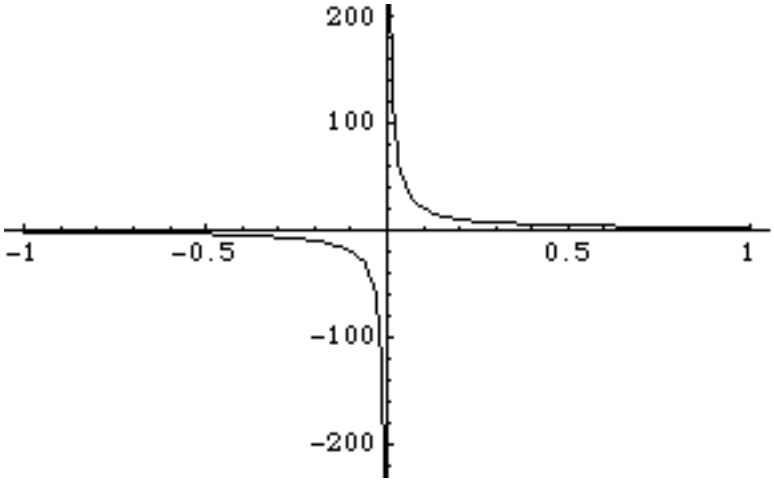
3) $f(x) = x^2 e^{2x}$



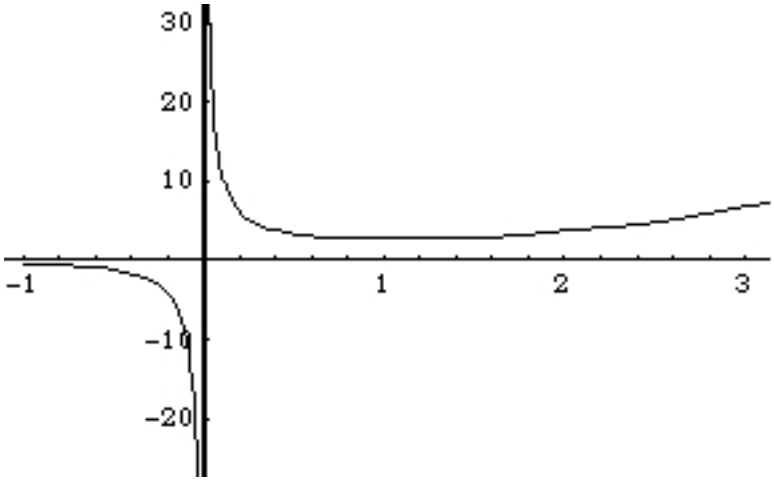
4) $f(x) = \frac{e^{-x}}{1+x}$



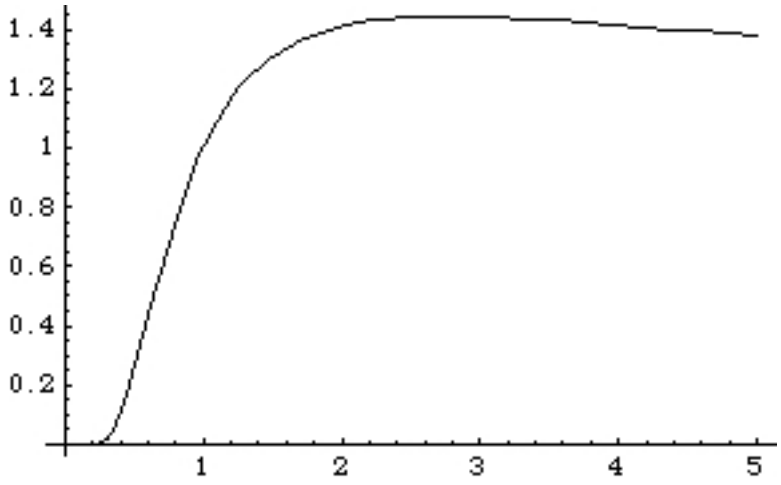
5) $f(x) = \frac{e^{x}+1}{e^{x}-1}$



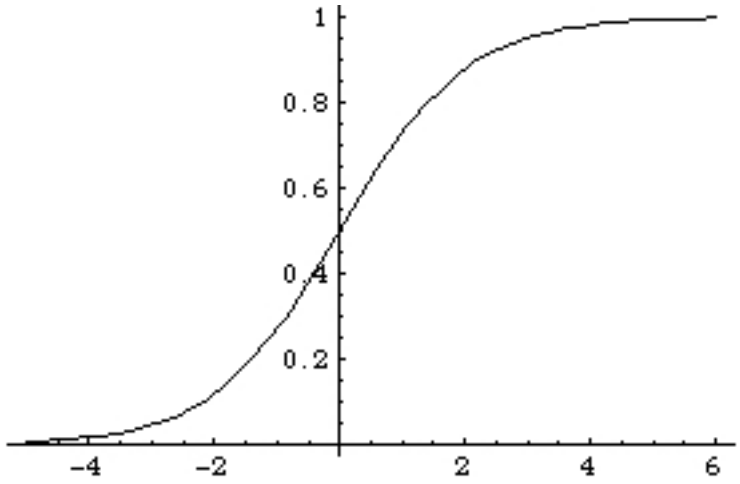
6) $f(x) = \frac{e^{x}}{x}$



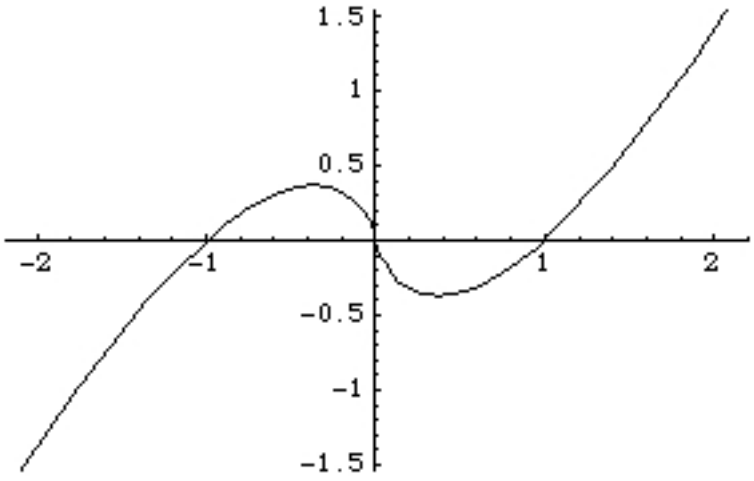
7) $f(x) = x^{\frac{1}{x}}$



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



9) $f(x) = x\ln|x|$



10) $f(x) = x.e^{\frac{1}{x}}$