Exo 1 :

1. $\ln\left(\frac{16}{27}\right) - \ln(81)^2 = \ln 2^4 - \ln 3^3 - \ln 3^8 = \boxed{4\ln 2 - 11\ln 3}$

- $\ln(32) - \ln\left(\frac{16}{64}\right) = \ln 2^5 - \ln\left(\frac{2^4}{2^6}\right) = \boxed{7\ln 2}$
- $\frac{\ln 8e^2}{\ln 16} \ln 2 - \ln(2e) = \frac{3\ln 2 + 2}{4} - \ln 2 - 1 = \boxed{-\frac{1}{4}\ln 2 - \frac{1}{2}}$.
- $3\ln\sqrt{2} - \frac{1}{2}\ln 8 = \frac{3}{2}\ln 2 - \frac{3}{2}\ln 2 = \boxed{0}$
- $\ln\sqrt{27} + 2\ln 2 - \ln 9 - \ln 8 = \frac{3}{2}\ln 3 + 2\ln 2 - 2\ln 3 - 3\ln 2 = \boxed{-\frac{1}{2}\ln 3 - \ln 2}$

2. - $e^{\ln 5} + e^{\ln 3} = 5 + 3 = \boxed{8}$
- $e^{-2\ln 3} + e^{3\ln 2} = \boxed{\frac{1}{9} + 8}$
- $\ln\sqrt{e} = \boxed{\frac{1}{2}}$
- $\ln 4 - \ln\sqrt{2} = \boxed{\frac{3}{2}\ln 2}$
- $(e^x + e^{-x})^2 - (e^x - e^{-x})^2 = \boxed{4}$
- $(e^x - 1)^2 - e^{2x} = \boxed{2e^x + 1}$
- $\frac{e^x - 1}{e^x + 1} + \frac{e^{-x} - 1}{e^{-x} + 1} = \boxed{0}$

Exo 2 :

1. - $3 - 2e^{x^2-1} = 0 \iff e^{x^2-1} = 3/2 \iff x^2 - 1 = \ln 3/2 \iff \boxed{x = \pm\sqrt{1 + \ln\frac{3}{2}}}$
- $(2 - e^x)(e^x + 5) = 0 \iff e^x = 2$ ou $\cancel{e^x = -5} \iff \boxed{x = \ln 2}$
- $e^{2x} - 6e^x + 5 = 0 \iff (e^x - 1)(e^x - 5) = 0 \iff e^x = 1$ ou $e^x = 5$
$\iff \boxed{x = 0 \text{ ou } x = \ln 5}$
- $3e^x - 7e^{-x} - 20 = 0 \iff 3e^{2x} - 20e^x - 7 = 0$
$\Delta' = 100 - 21 = 79$
$\iff e^x = \frac{10 \pm \sqrt{79}}{3}$ (les 2 sol > 0)
$\iff \boxed{x = \ln\left(\frac{10 \pm \sqrt{79}}{3}\right)}$.

2. a. $4\ln(5x-2)=3 \iff 5x-2=e^{3/4}$

$\iff \boxed{x=\frac{2}{5}+\frac{1}{5}e^{3/4}}$.

b. $x>3 \rightsquigarrow x(x-3)=4 \iff x^2-3x-4=0$

$\iff (x+1)(x-4)=0$

$\iff x=-1$ ou $x=4$ mais $x=1$ interdit

$\iff x=4$.

c). $x>3$ ou $x<0 \rightsquigarrow x=-1$ ou $x=4$

d) $x\in]-1,1[\rightsquigarrow 1-x^2=\frac{4}{25} \rightsquigarrow x^2=\frac{21}{25} \rightsquigarrow x=\pm\sqrt{\frac{21}{25}}$

e) $-13<x<2$ ou $x>3$ $\Big\}$ $(3-x)(2-x)=13+x \iff x^2-6x-7=0$

$\iff (x+1)(x-7)=0$

$\iff x=-1$ ou $x=7$.

f) $x>7$, $(2x-1)(x-7)=7 \iff 2x^2-15x=0$

$\iff x=0$ ou $x=\frac{15}{2}$

interdit

$\iff x=\frac{15}{2}$.

g) $x>3$, $\frac{x-3}{x-2}=4 \iff x-3=4x-8 \iff 3x=5 \iff x=\frac{5}{3}$

interdit

pas de solut°.