

ex 1 a) $f'(x) = \frac{1}{x^{17}-x+2} \cdot (x^{17}-x+2)' = \frac{17x^{16}-1}{x^{17}-x+2}$ (2)

[1/2] b) $f'(x) = [(\ln(x))^4]' = 4 \ln^3(x) \cdot (\ln(x))' = 4 \ln^3(x) \cdot \frac{1}{x}$ (2)

c) $f'(x) = [\ln(x^4)]' = \frac{1}{x^4} \cdot (x^4)' = \frac{1}{x^4} \cdot 4x^3 = \frac{4}{x}$ (2)

d) $f'(x) = e^{-9x} \cdot (-9x)' = -9e^{-9x}$ (2)

e) $f'(x) = 2(e^x) \cdot (e^x)' = 2e^x \cdot e^x = 2(e^x)^2 = 2e^{2x}$ (2)

f) $f'(x) = [e^{(e^x)}]' = e^{(e^x)} \cdot (e^x)' = e^{(e^x)} \cdot e^x$ (2)

ex 2 $f(x) = \frac{x^2-1}{x^3-3x} = \frac{1}{3} \left(\frac{3x^2-3}{x^3-3x} \right)$ (3)

[1/3] g) $F(x) = \frac{1}{3} \ln|x^3-3x|$

[1/6] ex 3 $f(x) = -\left[\frac{(\cos(x))'}{\cos(x)+1} \right] \Rightarrow F(x) = -\ln|\cos(x)+1| + C$ (3)

on vert: $F(\frac{\pi}{2}) = 1 \Leftrightarrow -\ln|\underbrace{\cos(\frac{\pi}{2})}_=0| + C = 1$

$\Leftrightarrow -\ln|-1| + C = 1$

$\Leftrightarrow -\underbrace{\ln(1)}_0 + C = 1$
 $C = 1$

d'ou $F(x) = -\ln|\cos(x)+1| + 1$ (2)

ex 4 $f(x) = \frac{\sqrt{2}x}{x^2+1} = \sqrt{2} \cdot \frac{1}{2} \left[\frac{2x}{x^2+1} \right]$

[1/6] $\Rightarrow F(x) = \frac{\sqrt{2}}{2} \ln|x^2+1|$ (3)

$I = \frac{\sqrt{2}}{2} \ln|x^2+1| \Big|_{-1/2}^0 = \frac{\sqrt{2}}{2} \left[\underbrace{\ln|-1|}_0 - \ln|-\frac{3}{4}| \right] = -\frac{\sqrt{2}}{2} \ln\left(\frac{3}{4}\right)$ (3)