S. 157/4

a) $f(x) = 2\ln x$; $\mathbb{D} = \mathbb{R}^+$

$f'(x) = \frac{2}{x}$

b) $f(x) = \ln(2x)$; $\mathbb{D} = \mathbb{R}^+$

$f'(x) = \frac{1}{2x} \cdot 2 = \frac{1}{x}$ $\quad (\ln(2x) = \underbrace{\ln 2}_{\to 0} + \underbrace{\ln x}_{\to \frac{1}{x}}$!!)

c) $\ln\left(\frac{x}{3}\right) = f(x)$ $\quad \mathbb{D} = \mathbb{R}^+$

$f'(x) = \frac{3}{x} \cdot \frac{1}{3} = \frac{1}{x}$ $\quad (f(x) = \ln x - \ln 3)$

d) $f(x) = \ln(x^3)$; $\mathbb{D} = \mathbb{R}^+$

$f'(x) = \frac{1}{x^3} \cdot 3x^2 = \frac{3}{x}$ $\quad (f(x) = 3 \cdot \ln x \to f'(x) = \frac{3}{x})$

e) $f(x) = \ln(-3x)$; $\mathbb{D} =]-\infty; 0[= \mathbb{R}^-$

$f'(x) = \frac{-3}{x}$

f) $f(x) = \ln\left(\frac{1}{x}\right)$; $\mathbb{D} = \mathbb{R}^+$

$f'(x) = \frac{1}{\frac{1}{x}} \cdot \left(-\frac{1}{x^2}\right) = -\frac{1}{x}$ $\quad (f(x) = \ln(x^{-1}) = -1 \cdot \ln x$!)