1) $f(x) = x^2 + 2\sqrt{x}$

$f'(x) = 2x + 2 \times \frac{1}{2\sqrt{x}} = 2x + \frac{1}{\sqrt{x}}$

2) $g(x) = -2x^2 + 1 + e^{2x+4}$

$g'(x) = -2 \times 2x + 0 + 2e^{2x+4}$

$g'(x) = -4x + 2e^{2x+4}$

3) $h(x) = \frac{e^x + e^{-x}}{2}$

$h'(x) = \frac{e^x - e^{-x}}{2}$

4) $i(x) = 4xe^x - 1 = u(x)v(x) - 1$ où :

$\begin{cases} u(x) = 4x \\ u'(x) = 4 \end{cases}$ $\begin{cases} v(x) = e^x \\ v'(x) = e^x \end{cases}$

$i'(x) = u'(x)v(x) + u(x)v'(x) + 0$

$i'(x) = 4e^x + 4xe^x = (4x+4)e^x$.

5) $j(x) = 4x^3 + x + 7$

$j'(x) = 4 \times 3x^2 + 1 = 12x^2 + 1$

6) $k(x) = (4x^3 + x + 7)^5 = (j(x))^5$

$k'(x) = 5j'(x)(j(x))^4 = 5(12x^2+1)(4x^3+x+7)^4$

7) $l(x) = 2e^{x^2+4x-1} = 2e^{u(x)}$

où $\begin{cases} u(x) = x^2 + 4x - 1 \\ u'(x) = 2x + 4 \end{cases}$

$l'(x) = 2u'(x)e^{u(x)} = 2(2x+4)e^{x^2+4x-1}$

8) $m(x) = \frac{e^x}{x} = \frac{u(x)}{v(x)}$ où : $\begin{cases} u(x) = e^x \\ u'(x) = e^x \end{cases}$ $\begin{cases} v(x) = x \\ v'(x) = 1 \end{cases}$

$m'(x) = \frac{u'(x)v(x) - u(x)v'(x)}{v^2(x)}$

$m'(x) = \frac{e^x - xe^x}{x^2} = \frac{e^x(-x+1)}{x^2}$

9) $n(x) = \frac{1}{10 + e^{-x}} = \frac{1}{v(x)}$ où :

$\begin{cases} v(x) = 10 + e^{-x} \\ v'(x) = 0 + (-1)e^{-x} = -e^{-x} \end{cases}$

$n'(x) = \frac{-v'(x)}{v^2(x)} = \frac{-(-e^{-x})}{(10+e^{-x})^2} = \frac{e^{-x}}{(10+e^{-x})^2}$

10) $o(x) = \sqrt{2x^4 + e^{-x^2}} = \sqrt{u(x)}$

où $\begin{cases} u(x) = 2x^4 + e^{-x^2} \\ u'(x) = 2 \times 4x^3 + (-2x)e^{-x^2} = 8x^3 - 2xe^{-x^2} \end{cases}$ car $e^{-x^2} = e^{w(x)}$

où $\begin{cases} w(x) = -x^2 \\ w'(x) = -2x. \end{cases}$

et $(e^w)' = w'e^w$.

Donc $o'(x) = \frac{u'(x)}{2\sqrt{u(x)}} = \frac{8x^3 - 2xe^{-x^2}}{2\sqrt{2x^4 + e^{-x^2}}}$

$o'(x) = \frac{2x(4x^2 - e^{-x^2})}{2\sqrt{2x^4 + e^{-x^2}}} = \frac{x(4x^2 - e^{-x^2})}{\sqrt{2x^4 + e^{-x^2}}}$