1) $f(x) = (x^2 - 1)\cdot\cos x$ → $u(x) = x^2 - 1$ und $v(x) = \cos x$ → $u'(x) = 2x$ und $v'(x) = -\sin x$

→ $f'(x) = 2x\cos x + (x^2 - 1)(-\sin x) = \underline{2x\cos x + (1 - x^2)\sin x}$

2) $f(x) = (e^x + 1)\sin x$ → $u(x) = e^x + 1$ und $v(x) = \sin x$ → $u'(x) = e^x$ und $v'(x) = \cos x$

→ $\underline{\underline{f'(x) = e^x \sin x + (e^x + 1)\cos x}}$

3) $f(x) = e^{-x}\sqrt{3x}$ → $u(x) = e^{-x}$ und $v(x) = \sqrt{3x}$ → $u'(x) = -e^{-x}$ und $v'(x) = \dfrac{3}{2\sqrt{3x}}$

→ $f'(x) = -e^{-x}\sqrt{3x} + e^{-x}\dfrac{3}{2\sqrt{3x}} = \dfrac{e^{-x}(-6x + 3)}{2\sqrt{3x}} = \underline{\underline{\dfrac{3e^{-x}(-2x + 1)}{2\sqrt{3x}}}}$

4) $f(x) = \dfrac{5}{2x} + \dfrac{5}{2x + 1} = \tfrac{5}{2}x^{-1} + 5\cdot(2x + 1)^{-1}$

→ $\underline{\underline{f'(x) = -\dfrac{5}{2x^2} - \dfrac{10}{(2x + 1)^2}}}$

5) $f(x) = \dfrac{4\cos x}{3e^x}$ → $u(x) = 4\cos x$ und $v(x) = 3e^x$ → $u'(x) = -4\sin x$ und $v'(x) = 3e^x$

→ $f'(x) = \dfrac{-12e^x \sin x - 12e^x \cos x}{9e^{2x}} = \underline{\underline{-\dfrac{4(\sin x + \cos x)}{3e^x}}}$

6) $f(x) = \dfrac{x - \sin x}{x + 1}$ → $u(x) = x - \sin x$ und $v(x) = x + 1$ → $u'(x) = 1 - \cos x$ und $v'(x) = 1$

→ $f'(x) = \dfrac{(1 - \cos x)(x + 1) - (x - \sin x)}{(x + 1)^2} = \underline{\underline{\dfrac{1 - x\cos x - \cos x + \sin x}{(x + 1)^2}}}$

7) $f(x) = \dfrac{(3 - x)\sin x}{3x^2}$ → $u(x) = (3 - x)\sin x$ und $v(x) = 3x^2$ → $u'(x) = -\sin x + (3 - x)\cos x$ und $v'(x) = 6x$

→

$f'(x) = \dfrac{(-\sin x + (3 - x)\cos x)\cdot 3x^2 - (3 - x)\sin x \cdot 6x}{9x^4} = \dfrac{3x(x\sin x + 3x\cos x - x^2\cos x - 6\sin x)}{9x^4}$

$\underline{\underline{= \dfrac{x\sin x + 3x\cos x - x^2\cos x - 6\sin x}{3x^3}}}$

8) $f(x) = -\tfrac{3}{4}\sin\sqrt{x}$ → $i(x) = \sqrt{x}$ und $a(i(x)) = -\tfrac{3}{4}\sin\sqrt{x}$ → $i'(x) = \dfrac{1}{2\sqrt{x}}$ und $a'(i(x)) = -\tfrac{3}{4}\cos\sqrt{x}$

→ $\underline{\underline{f'(x) = -\dfrac{3\cos\sqrt{x}}{8\sqrt{x}}}}$

9) $f(x) = -\cos(x + 1)\cdot\sin(1 - x^2)$ → $u(x) = -\cos(x + 1)$ und $v(x) = \sin(1 - x^2)$

→ $u'(x) = \sin(x + 1)$ und $v'(x) = -2x\cos(1 - x^2)$

→ $\underline{\underline{f'(x) = \sin(x + 1)\cdot\sin(1 - x^2) + 2x\cos(x + 1)\cdot\cos(1 - x^2)}}$

10) $f(x) = \dfrac{x\cdot e^{-2x}}{3 - \sqrt{x}}$ → $u(x) = x\cdot e^{-2x}$ und $v(x) = 3 - \sqrt{x}$

→ $u'(x) = e^{-2x} + x(-2)e^{-2x} = e^{-2x}(1 - 2x)$ und $v'(x) = -\dfrac{1}{2\sqrt{x}}$

→ $f'(x) = \dfrac{e^{-2x}(1 - 2x)(3 - \sqrt{x}) - x\cdot e^{-2x}\left(-\dfrac{1}{2\sqrt{x}}\right)}{(3 - \sqrt{x})^2} = \underline{\underline{\dfrac{e^{-2x}(6\sqrt{x} - 2x - 12x\sqrt{x} + 4x^2)}{2\sqrt{x}(3 - \sqrt{x})^2}}}$