Derivování

$$f_1(x) = 7x^4 - x^5 \qquad f_1'(x) = 7\cdot 4x^3 - 5x^4 = 28x^3 - 5x^4$$

$$f_2(x) = \sin(5x) \qquad f_2'(x) = \cos(5x)\cdot 5$$

$$f_3(x) = x^2\cdot\cos(x^2) \qquad f_3'(x) = 2x\cdot\cos x^2 + x^2(\cos x^2)' = 2x\cos x^2 + x^2(-\sin x^2)\cdot 2x$$

$$f_4(x) = \frac{\sqrt{2x}}{x^2+1} \qquad f_4'(x) = \frac{(\sqrt{2x})'(x^2+1) - \sqrt{2x}\,(x^2+1)'}{(x^2+1)^2} =$$

$$(\sqrt{2x})' = \left[(2x)^{\frac{1}{2}}\right]' = \frac{1}{2}(2x)^{-\frac{1}{2}}\cdot 2 \qquad = \frac{\frac{1}{\cancel{2}}(2x)^{-\frac{1}{2}}\cdot\cancel{2}\,(x^2+1) - \sqrt{2x}\cdot 2x}{(x^2+1)^2}$$

$$x^{-\frac{1}{2}}$$

$$(x^n)' = n\cdot x^{n-1} \qquad (2x)^{-\frac{1}{2}}$$

$$f_5(x) = \sin\left(\sqrt{x^3-7x}\right)$$

$$f_5'(x) = \underbrace{\cos\left(\sqrt{x^3-7x}\right)}_{\sin} \underbrace{\frac{1}{2}\left(x^3-7x\right)^{-\frac{1}{2}}}_{\sqrt{}} \underbrace{\left(3x^2-7\right)}_{\text{vnitřek}}$$

$$f_6(x) = e^{x\cdot\cos 3x}$$

$$f_6'(x) = e^{x\cos 3x}\cdot\left(x\cos 3x\right)' = \cancel{e^{x\cos 3x}} =$$

$$= e^{x\cos 3x}\left(\cos 3x + x(-\sin 3x)\cdot 3\right)$$

$$\left(\sqrt[3]{7x-1}\right)' = \left[(7x-1)^{\frac{1}{3}}\right]' = \frac{1}{3}(7x-1)^{-\frac{2}{3}}\cdot 7$$

$$\left(x^n\right)' = n\cdot x^{n-1}$$

$$\left(\boxed{7x-1}^{\,n}\right)' = n\cdot\boxed{7x-1}^{\,n-1}\cdot\boxed{7x-1}'$$

$$f_7(x) = \ln(x^2+1) \qquad f_7'(x) = \frac{1}{x^2+1} \cdot 2x$$

$$f_8(x) = \cos\left(e^{x \cdot \sin x}\right) \qquad f_8'(x) = -\sin\left(e^{x\sin x}\right) e^{x\sin x} \cdot (\sin x + x\cos x)$$

$$\sin x + x\cos x = (x \cdot \sin x)'$$

$$(f \cdot g)' = f' \cdot g + f g'$$

$$\cos^2 5x = (\cos 5x)^2 \qquad \left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2} \qquad (\cos^2 5x + \sin^2 5x = 1)$$

$$f_9(x) = \operatorname{tg}(5x) = \frac{\sin 5x}{\cos 5x} \qquad f_9'(x) = \frac{\cos 5x \cdot 5 \cos 5x + \sin 5x \sin 5x \cdot 5}{\cos^2 5x} = \frac{5}{\cos^2 5x}$$

$$f_{10}(x) = \sin \frac{2x}{x^2+2} \qquad f_{10}'(x) = \cos\left(\frac{2x}{x^2+2}\right) \cdot \frac{2(x^2+2) - 2x \cdot 2x}{(x^2+2)^2}$$