次の式を微分しなさい。

(1) $y = \sin(2\sqrt{x}+1)$　　(2) $y = \sin^2 x \cos 2x$

(3) $y = \cos^2\left(2x - \frac{\pi}{4}\right)$　　(4) $y = \frac{1+\sin x}{\cos x}$

(1) $y' = \cos(2\sqrt{x}+1)(2x^{\frac{1}{2}}+1)'$

$y' = \dfrac{\cos(2\sqrt{x}+1)}{\sqrt{x}}$

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

$y' = \underbrace{2\sin x \cos x}_{\sin 2x} \cdot \cos 2x - \underbrace{2\sin^2 x}_{1-\cos 2x} \sin 2x$

$y' = \sin 2x \cos 2x - (1-\cos 2x)\sin 2x$

$= \sin 2x \cos 2x - \sin 2x + \sin 2x \cos 2x$

$= \underbrace{2\sin 2x \cos 2x}_{\sin 4x} - \sin 2x$

$y' = \sin 4x - \sin 2x$

(3) $y' = 2\cos\left(2x-\frac{\pi}{4}\right)\left\{\cos\left(2x-\frac{\pi}{4}\right)\right\}'$

$= 2\cos\left(2x-\frac{\pi}{4}\right) - 2\sin\left(2x-\frac{\pi}{4}\right)$

$= -2 \cdot \underbrace{2\sin\left(2x-\frac{\pi}{4}\right)\cos\left(2x-\frac{\pi}{4}\right)}_{\sin\left\{2\left(2x-\frac{\pi}{4}\right)\right\}}$

$= -2\sin\left(4x-\frac{\pi}{2}\right)$

$= 2\sin\left(\frac{\pi}{2}-4x\right) = 2\cos 4x$

$y' = 2\cos 4x$

(4) $y' = \dfrac{\cos x \cdot \cos x - (1+\sin x)\cdot(-\sin x)}{\cos^2 x} = \dfrac{\cos^2 x + \sin^2 x + \sin x}{\cos^2 x}$

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

$y' = \dfrac{1}{1-\sin x}$