1. ...
2. Leite ab nach t ab

$$
\begin{aligned}
\frac{d}{dt}\sin 2\omega t &= 2\omega\cos 2\omega t \\
\frac{d}{dt}\cos 2\omega\left(t-\frac{T}{2}\right) &= -2\omega\sin\omega\,(2t-T) \\
\frac{d}{dt}\cos 2\omega\left(t-\frac{T}{2}\right)^2 &= -4\omega t\left(\sin\frac{1}{2}\omega\,(2t-T)^2\right)+2\omega T\left(\sin\frac{1}{2}\omega\,(2t-T)^2\right)
\end{aligned}
$$

$$
\begin{aligned}
\frac{d}{dt}(-\sin(\omega t-c)) &= -\omega\cos(\omega t-c) \\
\frac{d}{dt}\sin\left(\frac{2}{3}\omega t\right)^2 &= \frac{8}{9}\omega^2 t\left(\cos\frac{4}{9}\omega^2t^2\right) \\
\frac{d}{dt}\sin^2 t+2\cos^2 t &= 2\sin t\cos t+2\cos^2 t
\end{aligned}
$$

$$
\begin{aligned}
\frac{d}{dt}2\sin\omega_1 t\cdot\cos\omega_2 t &= \frac{d}{dt}2\sin\omega_1 t\cdot\cos\omega_2 t \\
\frac{d}{dt}\left(2\sin\omega_1 t\cdot\cos\omega_2 t\right)^2 &= 8\left(\sin\omega_1 t\cos^2\omega_2 t\cos\omega_1 t\right)\omega_1-8\left(\cos\omega_2 t\sin\omega_2 t\right)\omega_2+8\left(\cos\omega_2 t\sin\omega_2 t\right)\omega_2\cos^2\omega_1 t \\
\frac{d}{dt}\sqrt[3]{\sin\left(\frac{2}{3}\omega t\right)^2} &= \frac{8}{27}\frac{\sqrt[3]{\sin\frac{4}{9}\omega^2t^2}}{\sin\frac{4}{9}\omega^2t^2}\left(\cos\frac{4}{9}\omega^2t^2\right)\omega^2 t
\end{aligned}
$$

$$
\frac{d}{dt}\frac{U}{\sin 2\omega t} = -2U\left(\cos 2\omega t\right)\frac{\omega}{1-\cos^2 2\omega t} \quad (1)
$$

$$
\frac{d}{dt}\sin\frac{5}{t} = -5\frac{\cos\frac{5}{t}}{t^2} \quad (2)
$$

$$
\frac{d}{dt}\left(\sin\cos\omega t\right)^2 = -2\omega\sin\left(\cos\omega t\right)\cos\left(\cos\omega t\right)\sin\omega t \quad (3)
$$

$$
\frac{d}{dt}\tan 5t = 5+5\tan^2 5t \quad (4)
$$

$$
\frac{d}{dt}e^{\sin^2 2\omega t} = 4\omega\left(\sin 2\omega t\cos 2\omega t\right)e^{-(\cos 2\omega t-1)(\cos 2\omega t+1)} \quad (5)
$$

3. Finde Stammfunktion bzw. berechne das Integral

$$
\begin{aligned}
\int\sin 2\omega t dt &= -\frac{1}{2\omega}\cos 2\omega t+C \\
\int\sin 3\left(-2\omega t\right)dt &= \frac{1}{6\omega}\cos 6\omega t+C \\
\int\left(\sin 2\omega t+\cos\omega t\right)dt &= -\frac{1}{2\omega}\cos 2\omega t+\frac{\sin\omega t}{\omega}+C \\
\int_0^{\frac{T}{2}}\cos\frac{1}{2}\omega t dt &= 2\frac{\sin\frac{1}{4}\omega T}{\omega}=\frac{1}{\pi}T \\
\int_0^{T}\sin 2\omega t dt &= -\frac{1}{2}\frac{\cos 2\omega T-1}{\omega}\ \text{ mit } \omega=\frac{2\pi}{T}\text{ dann } 0 \\
\int_0^{\frac{T}{4}}\cos\omega t dt &= \frac{\sin\frac{1}{4}\omega T}{\omega}=\frac{1}{2\pi}T \\
\int_0^{3T}\left|\sin\omega t\right|dt &= 6\int_0^{\frac{T}{2}}\sin\omega t\,dt=-6\frac{\cos\frac{1}{2}\omega T-1}{\omega}\ \text{ mit } \omega=\frac{2\pi}{T}\text{ dann }\frac{6}{\pi}T
\end{aligned}
$$