

# Transform Tables

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## Useful Equations

<b>Eulers Formula</b>	$e^{j\varphi} = \cos(\varphi) + j\sin(\varphi)$
<b>Eulers Cosine</b>	$\cos(x) = \frac{e^{jx} + e^{-jx}}{2}$
<b>Eulers Sine</b>	$\sin(x) = \frac{je^{jx} - je^{-jx}}{2}$
<b>Angular Frequency</b>	$\omega = 2\pi f$
<b>Period</b>	$T = \frac{1}{f}$

## Common Integrals

$\int u \, dv = uv - \int v \, du$
$\int \frac{1}{ax+b} \, dx = \frac{1}{a} \ln(ax+b)$
$\int \sin(x) \, dx = -\cos(x)$
$\int \cos(x) \, dx = \sin(x)$
$\int e^{ax} \, dx = \frac{1}{a} e^{ax}$
$\int xe^x \, dx = (x-1)e^x$

## Common Derivatives

$\frac{d}{dx}(f(x)g(x)) = f(x)\dot{g}(x) + \dot{f}(x)g(x)$
$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f(x)\dot{g}(x) - \dot{f}(x)g(x)}{(g(x))^2}$
$\frac{d}{dx}(\sin(x)) = \cos(x)$
$\frac{d}{dx}(\cos(x)) = -\sin(x)$
$\frac{d}{dx}(\tan(x)) = \sec^2(x)$
$\frac{d}{dx}(\sin^{-1}(x)) = \frac{1}{\sqrt{1-x^2}}$
$\frac{d}{dx}(\cos^{-1}(x)) = \frac{-1}{\sqrt{1-x^2}}$
$\frac{d}{dx}(\tan^{-1}(x)) = \frac{1}{1+x^2}$
$\frac{d}{dx}(a^x) = a^x \ln(a)$
$\frac{d}{dx}(\ln x ) = \frac{1}{x}$
$\frac{d}{dx}(\log_a(x)) = \frac{1}{x \ln(a)}$

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