

# Integrals

$$(1) \int_0^{2\pi} e^{inx} dx = \begin{cases} 0 & n \neq 0 \\ 2\pi & n = 0 \end{cases}$$

$$(2) \int_0^{2\pi} e^{ix} \sin x dx = i\pi \int_0^{2\pi} e^{-ix} \sin x dx = -i\pi$$

$$(3) \int_0^{2\pi} e^{ix} \cos x dx = \int_0^{2\pi} e^{-ix} \cos x dx = \pi$$

$$(4) \int_0^{\pi} \sin^2 x dx = \int_0^{\pi} \cos^2 x dx = \frac{\pi}{2} \quad \int_0^{\pi} \sin x \cos x dx = 0$$

$$(5) \int_0^{\pi} \cos^3 x dx = 0 \quad \int_0^{\pi} \sin^3 x dx = \frac{2}{3}$$

$$(6) \int_0^{\pi} \cos^2 x \sin x dx = \frac{1}{3} \quad \int_0^{\pi} \cos x \sin^2 x dx = 0$$

	plain	$\frac{\partial}{\partial y}$	$\frac{\partial}{\partial x}$
$\varphi_{01}$	$\sqrt{2} \cos \frac{y}{b}$	$-\frac{\sqrt{2}}{b} \sin \frac{y}{b}$	0

$\varphi_{11}$	$e^{ix} \sin \frac{y}{b}$	$\frac{1}{b} e^{ix} \cos \frac{y}{b}$	$e^{ix} \sin \frac{y}{b}$
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$\varphi_{-11}$	$e^{-ix} \sin \frac{y}{b}$	$\frac{1}{b} e^{-ix} \cos \frac{y}{b}$	$-e^{-ix} \sin \frac{y}{b}$
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$h$	$\cos x \sin \frac{y}{b}$	$\frac{1}{b} \cos x \cos \frac{y}{b}$	$-\sin x \cos \frac{y}{b}$
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