

§4.2.1

問題A

$$(1) \int_{-\pi}^{\pi} \sin x \, dx = -\cos x \Big|_{-\pi}^{\pi} = -\cos \pi + \cos(-\pi) = 0$$

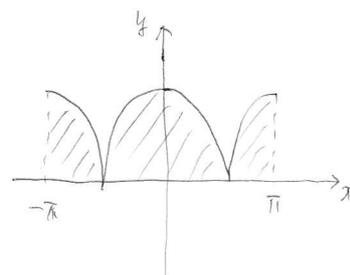
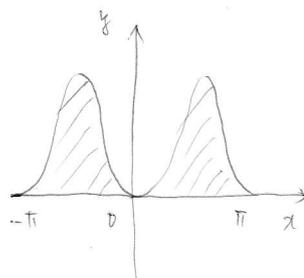
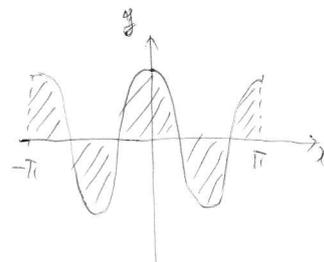
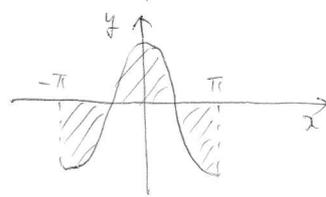
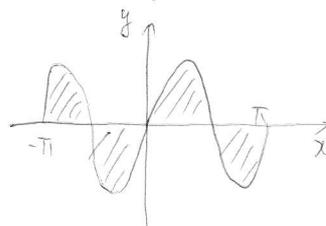
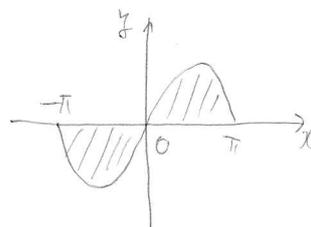
$$(2) \int_{-\pi}^{\pi} \sin 2x \, dx = -\frac{1}{2} \cos 2x \Big|_{-\pi}^{\pi} = -\frac{1}{2} + \frac{1}{2} = 0$$

$$(3) \int_{-\pi}^{\pi} \cos x \, dx = \sin x \Big|_{-\pi}^{\pi} = 0$$

$$(4) \int_{-\pi}^{\pi} \cos 2x \, dx = \frac{1}{2} \sin 2x \Big|_{-\pi}^{\pi} = 0$$

$$(5) \int_{-\pi}^{\pi} \sin^2 x \, dx = \int_{-\pi}^{\pi} \frac{1 - \cos 2x}{2} \, dx = \frac{1}{2} \left[x - \frac{1}{2} \sin 2x \right]_{-\pi}^{\pi} = \pi$$

$$(6) \int_{-\pi}^{\pi} \cos^2 x \, dx = \int_{-\pi}^{\pi} \frac{1 + \cos 2x}{2} \, dx = \frac{1}{2} \left[x + \frac{1}{2} \sin 2x \right]_{-\pi}^{\pi} = \pi$$



$$\boxed{2} (1) \int_{-\pi}^{\pi} \sin x \cos x dx = \int_{-\pi}^{\pi} \frac{\sin 2x}{2} dx = -\frac{1}{4} \cos 2x \Big|_{-\pi}^{\pi} = 0$$

$$(2) \int_{-\pi}^{\pi} \sin 3x \sin 2x dx = \int_{-\pi}^{\pi} \frac{\cos 3x - \cos x}{-2} dx = -\frac{1}{2} \left[\frac{1}{3} \sin 3x - \sin x \right]_{-\pi}^{\pi} = 0$$

$$(3) \int_{-\pi}^{\pi} \cos x \cos 2x dx = \int_{-\pi}^{\pi} \frac{\cos 3x + \cos x}{2} dx = \frac{1}{2} \left[\frac{1}{3} \sin 3x + \sin x \right]_{-\pi}^{\pi} = 0$$

$$(4) \int_{-\pi}^{\pi} \sin x \cos 2x dx = \int_{-\pi}^{\pi} \frac{\sin 3x - \sin x}{2} dx = \frac{1}{2} \left[-\frac{1}{3} \cos 3x + \cos x \right]_{-\pi}^{\pi} = 0$$