

$$\textcircled{1} \int 2^{5x} dx = \int 32^x dx = \frac{1}{\ln 32} \cdot 32^x + C$$

$$\textcircled{2} \int \cos(3z+4) dz = \frac{1}{3} \int 3 \cos(3z+4) dz = \frac{\sin(3z+4) + C}{3}$$

$$\textcircled{3} \int \frac{x}{x^2+4} dx = \frac{1}{2} \int \frac{2x}{x^2+4} dx = \frac{1}{2} \ln(x^2+4) + C$$

$$\textcircled{4} \int_{-\pi/2}^{\pi/2} (8y^2 + \sin y) dy = \left[\frac{8y^3}{3} + -\cos y \right]_{-\pi/2}^{\pi/2}$$

$$\left[\frac{8\left(\frac{\pi}{2}\right)^3 - 8\left(-\frac{\pi}{2}\right)^3}{3} \right] + \left[-\cos\left(\frac{\pi}{2}\right) + \cos\left(-\frac{\pi}{2}\right) \right]$$

$$\frac{8\pi^3}{8} + \frac{8\pi^3}{8}$$

$$-1 + 0 + 0$$

$$\frac{2\pi^3}{3}$$

$$\textcircled{5} \int (x^2 + 14x + 49)^{35} dx = \int [(x+7)^2]^{35} dx$$

$$= \int (x+7)^{70} dx = \frac{(x+7)^{71}}{71} + C$$

$$\begin{aligned}
 \textcircled{6} \int_0^1 x \sqrt{1-x^2} dx &= -\frac{1}{2} \int -2x \sqrt{1-x^2} dx \\
 &= -\frac{1}{2} \left[\frac{2}{3} (1-x^2)^{3/2} \right]_0^1 = -\frac{1}{3} (1-x^2)^{3/2} \Big|_0^1 = \frac{-1}{3} (1-1)^{3/2} - \frac{-1}{3} (1)^{3/2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{7} \int_{\pi/3}^{\pi/2} (x + \cos x) dx &= \int_{\pi/3}^{\pi/2} x dx + \int_{\pi/3}^{\pi/2} \cos x dx \\
 &= \left[\frac{x^2}{2} \right]_{\pi/3}^{\pi/2} + \left[\sin x \right]_{\pi/3}^{\pi/2}
 \end{aligned}$$

$$\left[\frac{(\pi/2)^2}{2} - \frac{(\pi/3)^2}{2} \right] + \left[\sin(\pi/2) - \sin(\pi/3) \right]$$

$$\frac{\frac{\pi^2}{4} - \frac{\pi^2}{9}}{2} + 1 - \frac{\sqrt{3}}{2}$$

$$\frac{5\pi^2}{72} + \frac{2 - \sqrt{3} \cdot 36}{2 \cdot 36}$$

$$\frac{5\pi^2 + 72 - 36\sqrt{3}}{72}$$