

$$\begin{aligned} \text{Q. 4. } \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sin x \, dx &= -\left[\cos x\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} \\ &= -\left[\cos \frac{\pi}{2} - \cos \frac{\pi}{4}\right] \\ &= \frac{1}{\sqrt{2}} \end{aligned}$$

$$\begin{aligned} \text{Q. 5. } \int_{\ln 2}^{\ln 5} e^x \, dx &= \left[e^x\right]_{\ln 2}^{\ln 5} \\ &= e^{\ln 5} - e^{\ln 2} \\ &= 5 - 2 \\ &= 3 \end{aligned}$$

$$\begin{aligned} \text{Q. 6. } 2 \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos x \, dx &= 2 \left[\sin x\right]_{\frac{\pi}{6}}^{\frac{\pi}{3}} \\ &= 2 \left[\sin \frac{\pi}{3} - \sin \frac{\pi}{6}\right] \\ &= \sqrt{3} - 1 \end{aligned}$$

$$\begin{aligned} \text{Q. 7. } 4 \int_0^{\frac{\pi}{3}} \sin x \, dx &= -4 \left[\cos x\right]_0^{\frac{\pi}{3}} \\ &= -4 \left[\cos \frac{\pi}{3} - \cos 0\right] \\ &= 2 \end{aligned}$$

$$\begin{aligned} \text{Q. 8. } \int_0^{\frac{\pi}{4}} (\cos x + \sin x) \, dx &= \left[\sin x - \cos x\right]_0^{\frac{\pi}{4}} \\ &= \left(\sin \frac{\pi}{4} - \cos \frac{\pi}{4}\right) - (\sin 0 - \cos 0) = 1 \end{aligned}$$

$$\begin{aligned} \text{Q. 9. } \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (\cos x - \sin x) \, dx &= \left[\sin x + \cos x\right]_{\frac{\pi}{4}}^{\frac{\pi}{2}} \\ &= \left(\sin \frac{\pi}{2} + \cos \frac{\pi}{2}\right) - \left(\sin \frac{\pi}{4} + \cos \frac{\pi}{4}\right) \\ &= 1 - \sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{Q. 10. } \int_2^4 \frac{dx}{\sqrt{16-x^2}} &= \left[\sin^{-1} \frac{x}{4}\right]_2^4 \\ &= \sin^{-1} 1 - \sin^{-1} \frac{1}{2} \\ &= \frac{\pi}{2} - \frac{\pi}{6} = \frac{\pi}{3} \end{aligned}$$

$$\begin{aligned} \text{Q. 11. } \int_0^{\ln 2} e^{3x} \, dx &= \frac{1}{3} \left[e^{3x}\right]_0^{\ln 2} \\ &= \frac{1}{3} [e^{3 \ln 2} - e^0] \\ &= \frac{1}{3} [e^{\ln(2)^3} - 1] \\ &= \frac{1}{3} [e^{\ln 8} - 1] = \frac{1}{3} [8 - 1] = \frac{7}{3} \end{aligned}$$

$$\begin{aligned} \text{Q. 12. } \int_0^{\frac{\pi}{16}} \cos 4x \, dx &= \frac{1}{4} \left[\sin 4x\right]_0^{\frac{\pi}{16}} \\ &= \frac{1}{4} \left[\sin \left(\frac{\pi}{4}\right) - \sin 0\right] \\ &= \frac{1}{4\sqrt{2}} \end{aligned}$$

$$\begin{aligned} \text{Q. 13. } \int_0^{\frac{\pi}{6}} \sin 2x \, dx &= -\frac{1}{2} \left[\cos 2x\right]_0^{\frac{\pi}{6}} \\ &= -\frac{1}{2} \left[\cos \frac{\pi}{3} - \cos 0\right] \\ &= \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{Q. 14. } \int_0^{\frac{\pi}{6}} \cos 3x \, dx &= +\frac{1}{3} \left[\sin 3x\right]_0^{\frac{\pi}{6}} \\ &= +\frac{1}{3} \left[\sin \frac{\pi}{2} - \sin 0\right] \\ &= +\frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{Q. 15. } \int_0^{\frac{\pi}{12}} \sin 6x \, dx &= -\frac{1}{6} \left[\cos 6x\right]_0^{\frac{\pi}{12}} \\ &= -\frac{1}{6} \left[\cos \frac{\pi}{2} - \cos 0\right] \\ &= \frac{1}{6} \end{aligned}$$

$$\begin{aligned} \text{Q. 16. (i) } \int_0^2 \frac{dx}{x^2+4} &= \frac{1}{2} \left[\tan^{-1} \frac{x}{2}\right]_0^2 \\ &= \frac{1}{2} [\tan^{-1} 1 - \tan^{-1} 0] \\ &= \frac{\pi}{8} \end{aligned}$$

$$\begin{aligned} \text{(ii) } \int_0^{\frac{\pi}{2}} \cos^2 x \, dx &= \frac{1}{2} \int_0^{\frac{\pi}{2}} (1 + \cos 2x) \, dx \\ &= \frac{1}{2} \left[x + \frac{\sin 2x}{2}\right]_0^{\frac{\pi}{2}} \\ &= \frac{1}{2} \left[\frac{\pi}{2} + \frac{\sin \pi}{2}\right] \\ &= \frac{\pi}{4} \end{aligned}$$