



Definite Integrals Ex 20.3 Q23

$$\begin{aligned} & \int_0^{\frac{\pi}{2}} \cos^2 x dx - \int_{\frac{\pi}{2}}^{\pi} \cos^2 x dx \\ & \cos^2 x = \frac{1 + \cos 2x}{2} \\ & \int_0^{\frac{\pi}{2}} \frac{1 + \cos 2x}{2} dx - \int_{\frac{\pi}{2}}^{\pi} \frac{1 + \cos 2x}{2} dx \\ & \frac{1}{2} \left\{ x + \frac{\sin 2x}{2} \right\}_0^{\frac{\pi}{2}} - \frac{1}{2} \left\{ x + \frac{\sin 2x}{2} \right\}_{\frac{\pi}{2}}^{\pi} \\ & \frac{\pi}{4} - \frac{\pi}{4} \\ & 0 \end{aligned}$$

Definite Integrals Ex 20.3 Q24

$$\begin{aligned} & \int_{-\frac{\pi}{4}}^{\frac{\pi}{2}} (2 \sin |x| + \cos |x|) dx \\ & = \int_{-\frac{\pi}{4}}^0 (-2 \sin x + \cos x) dx + \int_0^{\frac{\pi}{2}} (2 \sin x + \cos x) dx \\ & = [2 \cos x + \sin x]_{-\frac{\pi}{4}}^0 + [-2 \cos x + \sin x]_0^{\frac{\pi}{2}} \\ & = 2 + 0 - 0 + 1 + 0 + 1 + 2 - 0 \\ & = 6 \end{aligned}$$

Definite Integrals Ex 20.3 Q25

$$\begin{aligned} & \int_{\frac{\pi}{2}}^{\pi} \sin^{-1}(\sin x) dx = \int_{\frac{\pi}{2}}^{\pi} x dx + \int_{\frac{\pi}{2}}^{\pi} (\pi - x) dx \\ & \Rightarrow \left\{ \frac{x^2}{2} \right\}_{\frac{\pi}{2}}^{\pi} + \left\{ \pi x - \frac{x^2}{2} \right\}_{\frac{\pi}{2}}^{\pi} \\ & \Rightarrow \left\{ (\pi^2 - \frac{\pi^2}{2}) - \left( \frac{\pi^2}{2} - \frac{\pi^2}{8} \right) \right\} \\ & \Rightarrow \left\{ \frac{\pi^2}{2} - \frac{3\pi^2}{8} \right\} \\ & \Rightarrow \frac{\pi^2}{8} \end{aligned}$$

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