(2)

(7) $\int_0^{\pi} \cos^{2n+1} x \, dx = \int_0^{\pi/2} \cos^{2n+1} x \, dx + \int_0^{\pi/2} \cos^{2n+1} (\pi - x) \, dx$

$= \int_0^{\pi/2} \cos^{2n+1} x \, dx + \int_0^{\pi/2} (-\cos x)^{2n+1} \, dx$

$= \int_0^{\pi/2} \cos^{2n+1} x \, dx - \int_0^{\pi/2} \cos^{2n+1} x \, dx$

$= 0$ $\left((-\cos x)^{2n+1} = -\cos^{2n+1} x \right)$

Q1:- Evaluate $\int_{-1}^{3} (x^3 + 3x^2) \, dx$

$= \int_{-1}^{3} x^3 \, dx + \int_{-1}^{3} 3x^2 \, dx$

$= \left[\frac{x^4}{4} \right]_{-1}^{3} + \left[x^3 \right]_{-1}^{3} = (3)^4$

$= \left[\frac{(3)^4}{4} - \frac{(-1)^4}{4} \right] + \left[(3)^3 - (-1)^3 \right]$

$= \left[\frac{81}{4} - \frac{1}{4} \right] + \left[27 - (-1) \right]$

$= \frac{81 - 1}{4} + (27 + 1)$

(2) $= 20 + 28 = 48$

Q2:- $\int_1^2 \frac{x^2 + 1}{x + 1} \, dx = \int_1^2 \frac{x^2 - 1 + 2}{x + 1} \, dx$